COMPUTERWORLD

OA

OFFICE AUTOMATION

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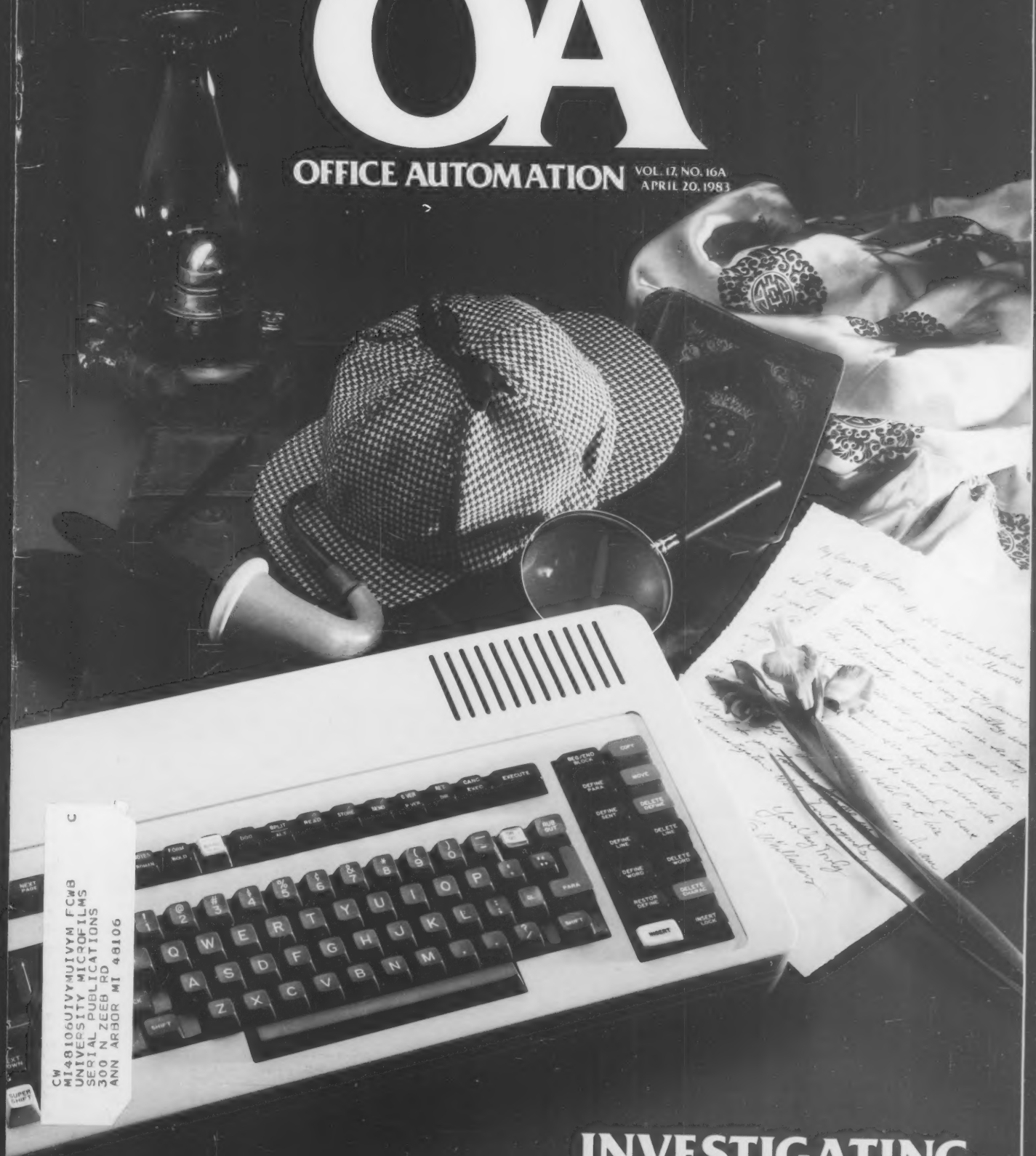

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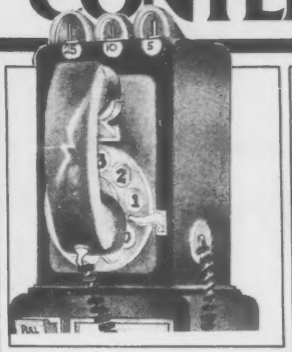
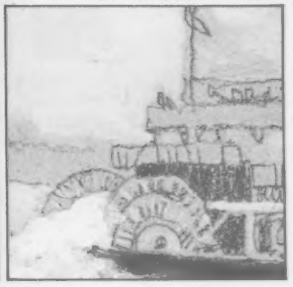
Everyone wants answers to the workstation puzzle. What we tend to forget is how new the workstation concept actually is and how much investigation is needed before we find our answers.
(Photo © 1983 Congraf/Mort Rabinow)





COMPUTERWORLD

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Hewlett-Packard on Office Systems

You don't have to buy separate syste processing. With the right solution, you

When you stop to think about it, all you really need from any business computer system is words, data, and graphics. And a way to make them available wherever they're needed. That's all there is to it.

At Hewlett-Packard, we think it's counterproductive to use completely separate systems just to get these simple, basic results.

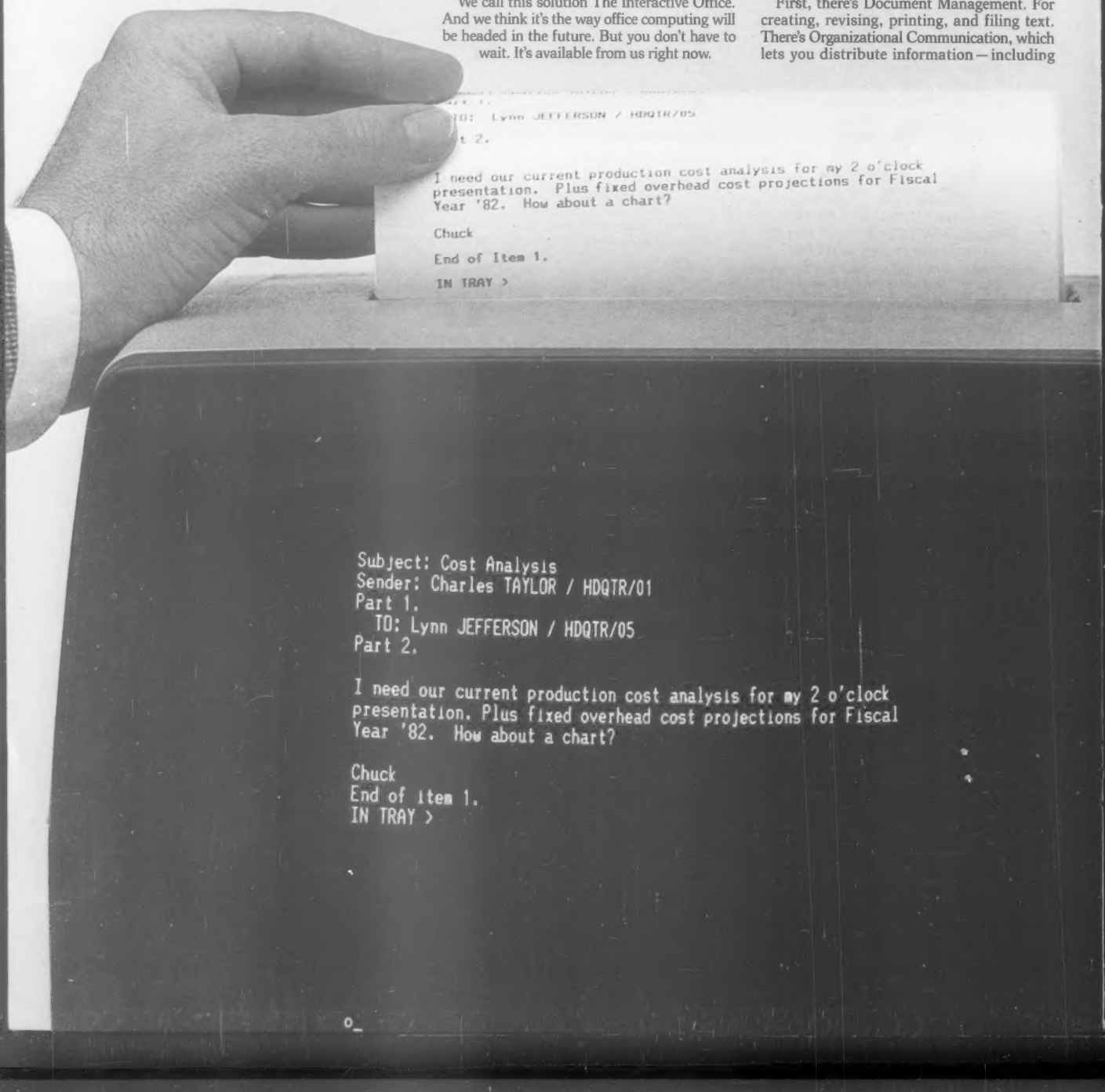
That's why we've developed a solution that puts the power of your data processing computer behind your office equipment. That makes every user's workstation a lot more versatile. And makes our data processing computer the driving force of a network that distributes on-line, interactive information all through your company.

We call this solution The Interactive Office. And we think it's the way office computing will be headed in the future. But you don't have to wait. It's available from us right now.

More power at every workstation. More versatility for every user.

Instead of designing The Interactive Office around a computer, we built it around the needs of the user. And organized it into four functional areas, each centered on the different jobs that come up in everyday business activity.

First, there's Document Management. For creating, revising, printing, and filing text. There's Organizational Communication, which lets you distribute information — including


Subject: Cost Analysis
Sender: Charles TAYLOR / HDQTR/01
Part 1.
TO: Lynn JEFFERSON / HDQTR/05
Part 2.
I need our current production cost analysis for my 2 o'clock presentation. Plus fixed overhead cost projections for Fiscal Year '82. How about a chart?
Chuck
End of Item 1.
IN TRAY >

ms for office automation and data can do it all.

reports, memos, charts and graphs—the instant they're created. There's Decision Support, which makes it easy to get what you need to analyze, interpret, and present information. Finally, there's Personal Support, which helps you design a personalized approach to business computing.

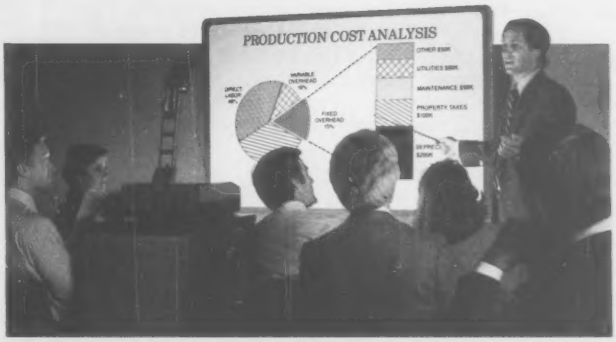
So it doesn't matter if you use the computer for word processing, electronic mail, to generate management reports, or to create charts and graphs. Or to do any combination of those things. In The Interactive Office, you can sit down at one workstation and do it all.

Just to give you one example, a secretary's main responsibility might be word processing. But your secretary can use the same word processing workstation to generate a management report for you, complete with charts and graphs, and then distribute your report electronically to branch offices all over the world.

And that's just the beginning. Because every one of our workstations can share the same valuable network resources: high-speed laser printers, data bases, communications links, and more.

More flexibility from your computer.

Our largest HP 3000 is powerful enough to process a large transaction like the company payroll, and support up to 100 Interactive Office users at the same time. But to give you even more flexibility, the first HP 3000 we ever built is software-compatible with our newer, faster models. Which makes it possible to upgrade to a bigger, more powerful model. Or combine several different models into a multi-node network. Without changing a single line of software.



And besides our powerful office automation functions, we have a full range of software tools for your EDP department. Starting with our IMAGE database, which has won worldwide recognition for its versatility and ease of use. Then there's our set of tools for programmer productivity, which help make them more efficient at designing, implementing, and maintaining new applications. To reduce the EDP backlog even more, we also have a range of off-the-shelf software solutions for manufacturing, distribution, and accounting.

Even the service and support are totally integrated.

Another good reason to do business with HP is our integrated service, which is available from more than 180 facilities all over the world. We'll assign a support team to help you plan your interactive office. They'll get to know your people—and your applications. And of course, they'll make regularly scheduled preventive maintenance checks.

All of this helps explain why we've maintained a leading position in customer service two years in a row, according to the 1981 and 1982 Datapro surveys, which involved thousands of computer users. And on the subject of reliability, we'll be glad to offer you our Guaranteed Uptime Service. Which states, in a nutshell, that if your HP 3000 system is up less than 99% of the time over a three-month period, your next month's service contract on all covered items is absolutely free.

So if you're looking at a lot of different computer systems for your office, we think you'd do well to see how your company could work if you tied it all together with one efficient, integrated solution.

If you'd like to find out more, stop by the local HP sales office closest to you. Or send for our brochure: The Interactive Office. Just write John Celii, Hewlett-Packard, Dept. 03142, 19447 Pruneridge Avenue, Cupertino, CA 95014.

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COMMENT

What you see isn't always what you get — at least not anymore. Information, an intangible product, is an elementary yet highly critical aspect of today's businesses. Although information can rarely be quantified, the quality of it can mean success or failure for an organization.

We no longer work in an industrial society. More than 50% of jobs in the U.S. are service- or information-oriented. The days when productivity could be measured just by the number of widgets produced are ending, and top management needs to adjust its investment philosophy accordingly. Although it is generally accepted that office automation will improve productivity, no fool-proof method to measure increases in efficiency resulting from automation is in sight.

This inability to measure increases in productivity is causing confusion and indecision in companies across the country. Soft-dollar savings are harder to verify on a spreadsheet than hard-dollar cost-justifications. Does this mean that soft-dollar savings are not as worthwhile as traditional cost accounting? Definitely not. Some companies have already realized this and are installing systems without hard-dollar justifications.

This is not to say that responsible fiscal policy should go out the window. But forcing companies to cost-justify on a hard-dollar basis is beginning to be like forcing a square peg into a round hole — it just doesn't work. Proving hard-dollar savings may be possible on the factory floor, but it is frequently only a pro-forma exercise in the office. Furthermore, no method exists to compute soft-dollar savings of time or improved efficiency.

While companies are stalling instead of installing, white-collar labor costs continue to increase and the cost of supplies, communications and travel continue their inflationary spiral. Companies that remain inactive will fall further and further behind competitors who advance up the learning curve. Top management has to realize that the difficulty in measuring OA's productivity will remain a dilemma for some time. No solution is on the horizon. Managers need to understand that the very nature of business is changing, and to remain competitive, they have to change, too. If automating applications seems right for an organization, managers may have to bite the bullet and proceed without the security crutch of hard figures. As more and more farseeing companies begin to advance in this manner, a snowballing effect will take place, bringing in its trail new investment values.

A.D.

FORUM

By Jack Stone

Trainers, users and company officials all have different conceptions of what it takes to train managers and executives to deal effectively with business systems. One common approach states that executives reject terminals and personal computers because they are ignorant, distrusting or fearful of them. Carried a bit further, this way of thinking concludes that executives in their '50s are too set in ways of thought formed in preautomation days to be able to use computers.

Not so. I am only one of a very large number of old geezers who, although enmeshed in corporate enterprise for years, saw the potential of personal computers long before the young turks in the computer center did — not to mention the vendors of giant mainframes. I was 50 years old when I snapped up a representative of the first generation of these machines in 1978.

However, it is true that training executives and managers — young and old geezers alike — is a fine art form. To do the job right, the person in charge of training must pay more than normal attention to the sociological aspects of the classroom situation, including instructional style, physical facilities and class composition.

Executives and managers understand the fundamentals of what computerized business systems do; they learned this on the job. They also generally know what they need in the way of additional training. Their problem is that they cannot easily find this training in a form that is effective for them. For training to be effective for executives and managers, it must include additional detail on the technology, systems development and systems operations necessary to control the systems department — the total department, including not only the machinery, but also the managers, employees and, now more than ever, overall costs.

For years, in spite of plummeting decreases in unit costs of computing, total costs for information systems have soared, and the end is nowhere in sight. The top people are steeped in frustration because they lack the training to get the right answers (or at least answers they can understand) from the computer technicians. These top people are not certain what the organization is getting for its money. As a result, they are not confident in the quality of their decision making in the systems arena.

For example, most executives are not intimidated by keyboards. Rather, they are irritated with systems designers who make it a habit of producing user-hostile and user-unforgiving interfaces for business systems. These officials are perfectly aware that improved designs have been available at the microcomputer and small minicomputer levels for some years now. They have difficulty understanding why, then, the interfaces for larger machines are so user-antagonistic.

To be able to come to terms with this and other problems, these top people need to be trained. Here are some thoughts on the design of introductory courses for executives and managers:

• **Course philosophy:** As a basic premise, organization leadership of all ranks requires management training with a systems and technology orientation, not the reverse. In particular, these people are definitely not interested in the academic material associated with learning how office systems work. They have no more need to understand chip substrata to perform their jobs than to understand thermodynamics to drive their cars. However, they do need to understand systems essentials to be effective in the office, just as they must be aware that their cars' engines need fuel and oil to be driven.

Executives and managers want to know the pragmatics of what office systems will do for the organization, how much such systems will cost and what controls are available to ensure quality of the systems products within established budgets.

• **Classroom environments:** The classroom situation for management personnel should closely resemble the operating environment of the client organization. The more realistic the setting, the more easily the attendees will learn the material and understand the systems applications.

For best results, the classroom should be supported by an office system configured in the same way as those installed in the orga-

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GOT ANYTHING WITH A RIVER VIEW?
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GOOD NEWS!!!

As a result of overwhelming interest from nontraditional *Computerworld* readers, we are now offering subscriptions to *Computerworld OA*. New readers can subscribe to OA for $12 a year, while current CW subscribers will continue to receive issues as part of their subscriptions.

Subscription forms can be found on Page 75 of this issue.

nization. Applications software and sample data and text files from live systems should be available at display terminals. Each attendee should be assigned his own terminal, with a maximum of eight attendees per class.

• **Attendees:** Each class should be composed of groups of peers, although not necessarily from the same organizational component. Large differences in rank — at least as perceived by the attendees — seem to inhibit active participation in the class by the more junior people and to accentuate the interaction of a few senior ones.

Each attendee should be informed about details of the course well in advance of the course offering. This information should be relayed not only through written material, but also during a personal visit from the manager responsible for the training. A personal visit helps both to answer lingering questions and to justify the value of the training experience.

Attendees should introduce themselves within the first few minutes after the class convenes. Have them describe their affiliations, the nature of their jobs, what they expect to receive from the course and specific systems problems they might have. It is helpful if the trainer takes notes and makes certain each major topic of concern to the class is later addressed.

During the introduction, the instructor should emphasize the introductory nature of the program and let the attendees know what they will come away with when the course ends.

• **Subject matter:** Naturally, courses should be tailored to the specific needs and the availability of the attendees. Subjects to be covered should be directly related to the particular operational situation. The course might include computer concepts, word processing applications, DP applications, elements of computer programming, computer systems management and control and, of course, executive and management responsibilities for systems management.

• **Instructor's qualifications:** To help establish credibility with the audience, an instructor in the executive classroom should have personal experience in managing business systems. The instructor should also be a consummate communicator with the ability not only to present technical subjects in a comprehensible way, but also to converse with the attendees in their own language. A final requirement is management-level knowledge of the systems applications used in the attendees' operations.

• **Instructional style:** I am an enthusiastic proponent of the hands-on approach, even for top executives. In lockstep and under the instructor's direction, the class should perform a large number of hands-on demonstrations at the display terminals. Each demonstration should be preceded by an instructor's briefing, which will include an overview of the systems function to be presented, the type of information to be entered, a summary of the processing procedures and a review of the final results.

This style of training has a number of advantages. It quickly allows the attendee to break through the barrier of the computer mystique. It offers attendees a personal operating experience with their own on-line applications in a controlled training environment. It reinforces the presentations of business systems concepts. Finally, it requires no prerequisites, not even typing skills. Only a few exercises should require the entry of a small amount of data because sample files should already be stored in the system for editing purposes.

Systems training for executives and managers can be effective, but, because of the sociological factors involved, it requires careful planning and implementation. Access to the same type of on-line system that is used operationally is necessary for success.

In spite of the costs involved, the payoff is well worth the investment.‡ OA

Stone is an independent consultant, writer and trainer who specializes in computer system management and personnel development.

TO OUR READERS

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NEWSBRIEFS

photo by G. Rifkin

◄PHILADELPHIA — Nearly 19,000 visitors streamed into the Philadelphia Convention Center in February for the 1983 Office Automation Conference (OAC). The OAC featured 150 vendor exhibits on the Convention Center floor and more than 50 technical sessions on the many issues surrounding office automation.

Keynote speaker John F. Cunningham, president of Wang Laboratories, Inc., set the tone for the conference by stating, "It doesn't matter that we communicate faster than ever before — if we communicate the same old message. It doesn't matter that we plug a computer into every outlet — if we use the computer to make the same mistakes more quickly. And it doesn't matter that technology can give us new services and products — if we can't apply them wisely to the critical, individual needs of people in the office."

OAC 84 is scheduled for February 20-22, in Los Angeles.

ARMONK, N.Y. — After 35 years with IBM, the past 10 as chairman of the board, Frank T. Cary has stepped down. Cary, 62, will remain a member of IBM's corporate office and chairman of the executive committee of the board of directors. John R. Opel, IBM's chief executive officer, will replace Cary as chairman of the board.

Succeeding Opel as IBM president will be John F. Akers, former senior vice-president and group executive of the Information Systems and Communications Group.

Cary joined IBM in 1948 as a marketing representative. He was named general manager for the Data Processing Group and vice-president in 1966; he joined the corporate office in 1969. He was elected president in 1971 and chairman and chief executive officer in 1973.

WILLOW GROVE, Pa. — A survey, designed to provide a picture of trends in office automation, has been published by the International Information/Word Processing Association (IWP).

The survey, "Training Services for Office Automation," covers such topics as the amount of training for WP operators and principals; the emphasis various industries place on skills such as computer graphics, electronic mail and computer programming; and obstacles to expanding training programs next year.

The complete survey report is available for $25 to nonmembers and $15 for IWP members from IWP, 1015 N. York Road, Willow Grove, Pa. 19090.

WESTBORO, Mass. — An agreement to develop an advanced capability for interconnecting Data General Corp.'s Comprehensive Electronic Office (CEO) system workstations through Northern Telecom Systems Corp.'s SL-1 digital business communications system has been announced by both corporations.

Under the agreement, the companies will also develop product enhancements to enable Northern Telecom's Displayphone to function as a workstation in DG's CEO office systems network. According to Northern Telecom, this is the first agreement that will allow the Displayphone to access another vendor's OA system.

NEW YORK — Teleport, a $350 million satellite communications center and office park currently under construction on Staten Island, will include key switching points strategically located to carry voice, video, data, facsimile and teleconference signals either through local terrestrial distribution networks or dedicated fiber runs. The vast telecommunications project, a joint venture of the Port Authority of New York and New Jersey, Merrill Lynch & Co., Inc. and Western Union Telegraph

BY THE END OF 1983, EVERY CRT TERMINAL IN YOUR SYSTEM MAY BE ILLEGAL.

IN FACT, THEY MAY BE NOW.

FACT: Legislation has passed in Wisconsin which sets demanding ergonomic criteria for CRT/VDT selection and use. Similar legislation has been introduced in California, Illinois, Michigan and Massachusetts.

FACT: At least six major labor unions have introduced ergonomic standards for CRT/VDT terminals into their collective bargaining agenda, standards not met by most of the CRT terminals manufactured in the world today. Among the unions actively negotiating standards are:

The Newspaper Guild
American Federation of Government Employees
Service Employees International Union
Communications Workers of America
United Auto Workers
Office and Professional Employees International Union

FACT: By 1985, CRT terminals exported to Germany and many European countries will be required to comply with stringent design criteria outlined by the German Ergonomic Standard—the same criteria used as the basis for U.S. standards and legislation.

FACT: Tandberg Data, Inc. manufactures the first CRT terminal available in the U.S. certified to meet the 1985 German standard, therefore, you can be sure it will meet increasing U.S. requirements.

Tandberg Data has delivered over 30,000 units worldwide to concerned companies like Lufthansa Airlines, Volvo AB, Skyway Freight Systems and Hyatt International—companies which understand the cost effectiveness of ergonomic design.

Tandberg Data invites you to spend a few important minutes with our team of ergonomic experts at NCC '83. We want you to see and feel the difference our TDV 2200 series of smart terminals can make in your system now, and as demands increase. We also have a free copy of our Ergonomic Checklist for you. Our booth number is P-7318-7324.

If you won't be at NCC, call or write us today for more information, plus a copy of our Ergonomic Checklist. It could mean the difference between planned growth or certain obsolescence. Tandberg Data, Inc., Labriola Court, Armonk, N.Y. 10504 (914) 273-6400.

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NEWSBRIEFS

Co., is being designed to ensure the preeminent position of the region in the field of communications technology and to stem the loss of industry from the area.

Upon completion, the Teleport will use 200 acres of industrial park and will provide 17 earth stations, allowing direct access to all U.S. domestic satellites as well as the potential for direct access to international/Intelsat satellites.

Access to the earth stations will be available in three distinct forms: privately owned, shared or universal access.

CAMBRIDGE, Mass. — The four-volume McQuillan Action Planning Guide, a series of practical handbooks on how vendor and end-user organizations can plan OA and communications systems, has been published by McQuillan Consulting, a Cambridge, Mass.-based consulting firm.

The Guide focuses on four major themes: planning your OA strategy, planning your architectural design, planning the selection of your systems and planning the implementation of your pilot.

The McQuillan Action Planning Guide sells for $4,995 for all four volumes and has a 15-day trial period. A charter subscription rate is available for $3,995 for orders received before May 15 from McQuillan Consulting, 380 Harvard St., Cambridge, Mass. 02138.

ALTADENA, Calif. — The editors of the "Telespan Newsletter," a monthly publication serving business communications leaders and teleconferencing users, have published *the Definitive Guide to Teleconferencing Products and Services.*

The guide, the culmination of two years of research, lists more than 500 products and 250 suppliers. Names, addresses, phone numbers and prices are supplied, as well as a listing of publications in the field.

The guide (along with a one-year subscription to the newsletter) is available for $180 from Telespan, Inc., 50 W. Palm St., Altadena, Calif. 91001.

BALA CYNWYD, Pa. — A monthly-updated guide to OA systems has been published by Advanced Office Concepts Corp. (AOC). The AOC Marketguide, a publication on integrated OA systems, software and services, will focus on areas of the OA marketplace, such as product announcements and market news; overviews on general and specific OA product groups, markets, and application areas; details on specific OA systems and on the manufacturers who market them; and recent books and publications listing other sources of information on products and market trends.

The guide, which will be updated monthly with new commentary, product reports and reviews, is available for an introductory subscription price of $95 per year in the U.S. and Canada and $125 elsewhere.

More information is available from AOC, One Bala Plaza, Bala Cynwyd, Pa. 19004.

CUPERTINO, Calif. — With a commitment to the use of private branch exchanges (PBX) as the principal communications method in its future computer networks for the office, Hewlett-Packard Co. has entered into agreements with several leading telecommunications suppliers to provide services to its U.S. customers.

HP has signed agreements with Rolm Corp., Northern Telecom, and Intecom, Inc. with the intention of using the data communications capabilities of these companies to connect HP data terminals to HP 3000 business computers.

WESTBORO, Mass. — When E.F. Hutton talked, Data General Corp. listened. As a result, DG will provide 300 to 400 Branch Information Processing Systems to E.F. Hutton & Co., Inc. in a nationwide integrated office network this year and next. The network, based on DG's Comprehensive Electronic Office (CEO), is valued in excess of $40 million and is based on the 32-bit Eclipse MV/4000 processor.

The integrated approach of CEO systems will reportedly permit simultaneous data base access for information retrieval, nationwide word processing, electronic mail, electronic filing and administrative support for Hutton account executives.

NEW YORK — The Microcomputer Managers Association (MMA), an organization "to coordinate the ideas and principles of the management of microcomputers in the organizational structure," according to MMA president Alan Gross, has been formed within the past year.

MMA membership already is said to include 40 professionals whose responsibilities within their companies include buying and installing microcomputers and training people to use them. For more information, contact Alan Gross at International Paper Co., Room 36-3, 77 W. 45th St., N.Y., N.Y. 10036. OA

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How Do You Spell Relief?

Is the workstation really so important for the office? Here are reasons why it is rapidly becoming a necessity.

By Evelyn S. Wilk

What is so special about the normal office functions described below?

A division manager of a manufacturing firm arrives at his office and reviews his mail; a financial analyst reviews budgetary data; a professional prepares several bar charts and pie charts for a presentation; a midwestern regional sales manager leaves a telephone message for a colleague in California.

Although these are the things we do every day in the office, they are special. Each was performed electronically, digitally, on an executive workstation.

So what? What is so important about the ability to perform office functions electronically? Are the vendors at it again with solutions to problems that don't exist? No. The vendors aren't snowing us. This time we do have a problem. To put it simply, we are drowning in a tidal wave of information.

As managers, we have more information than ever at our fingertips. John Opel, former president of IBM, once said, "Successful companies in the '80s will be those that manage their information effectively." As managers and executives, we analyze available information daily, determine which information is important to our decision-making process and also establish norms so we can use exception data to effectively augment our decision making. The executive/professional workstation helps us do all these things. It was designed to help us take information in whatever form it arrives, manipulate it and put it in the best medium for presentation — either to get the message across or to assist in decision making. But what specifically is that ideal shopping list of functions the executive workstation should perform? (We'll assume basic word processing.) Ideally, the executive should be able to perform the following functions:

• Electronic message systems, including text (electronic mail) and voice. Executives spend an enormous amount of time exchanging information with superiors, subordinates and peers. At least half of that exchange is basically asynchronous: the executive does not

require (or even sometimes desire) interaction. He merely seeks information in answer to a query. Both electronic mail and voice mail can reduce the frustrations of telephone tag and multi-time-zone exchanges.

• Personal computing capability, including spreadsheet and business graphics (pie charts and bar charts): Personal computing is not new. We've been computing by hand for centuries. However, the new automated tools allow us to keep more accurate records on the countless small items that are inputs to executive decision making. Most executive workstations offer the spreadsheet and graphics capabilities that have brought such fame to personal computers. In addition, the executive workstation gives the executive a significant added capability not offered by a stand-alone personal computer — an interface with corporate data.

• Administrative support functions, including scheduling of meetings, maintaining calendars, maintaining tickler files and electronic notebooks, automated telephone directories and electronic filing: Secretaries are not the only people who spend hours scheduling meetings. With the private secretary all but extinct, professionals at all levels are taking on a number of support tasks. Executive workstations assist not only in scheduling meetings, but also in maintaining tickler files, keeping telephone messages and telephone directories. In addition, they take on the time-consuming task of maintaining well-indexed files. In fact, with some software, indexing of the full text of all documents is an automatic byproduct of the storage function inself.

• Data base management (with report-writing capabilities): Executives have always maintained private data bases. "Data base" is a computer term; we've called them files. Because they are often small, function-specific and used for only a limited time, it has not been cost-effective to automate them on mainframes. Nevertheless, a user-oriented data base allows managers to create and manipulate information in an ad hoc manner.

• Interfacing with the outside: The executive cannot function in a vacuum. Similarly, the executive workstation must have links to corporate data, other OA systems, outside time-share services and perhaps even videotex-based automated libraries. These functions can be divided into two categories: those that can be performed in an independent manner and those whose effectiveness requires a network of systems. For example, business graphics and spreadsheets can be performed on a single terminal, with information from a single person. However, you cannot schedule a meeting with others unless you have access to their calendars, and you don't send electronic mail to yourself.

"No one terminal currently offers all the data-, text-, voice- and image-based functions. In the past, vendors chose a subset of functions and offered specialized hardware. As a result, today's executive workstations are evolving from a variety of bases."

No one terminal currently offers all the data-, text-, voice- and image-based functions just listed. In the past, vendors chose a subset of functions and offered specialized hardware (for example, word processors). As a result, today's executive workstations are evolving from a variety of bases — word processors, personal computers and telephones (voice terminals). Although there are a variety of approaches to the executive workstation, no one yet offers all the functionality required by our ideal list.

Today, word processors are adding computing capabilities, most often a Digital Research, Inc. CP/M operating system and spreadsheet software. Some have bar chart capability. However, most word processors cannot display pie charts with curvilinear graphics because their screens are character-generated rather than bit-mapped. As multiterminal WP systems evolve into full-scale OA systems, they are adding administrative and messaging functions and even some very user-friendly data base systems. Wang Laboratories, Inc.'s Audio Workstation was the first WP-based system to incorporate voice, and several other vendors are already following suit. With a Wang Audio Workstation, your telephone is hooked into the workstation itself. When you want to send a voice message, you dictate into the receiver, using keys on the workstation keyboard to manipulate the dictation. You can edit your dictation by using normal Wang commands.

Wang also offers a telephone messaging function. A secretary taking a phone message keys the information into a specialized screen. When the executive reads the electronic phone messages, he can reply simply by placing the cursor over the phone number field and pressing a function key. The system dials the number and even displays a prompt to tell him to pick up his receiver. While several vendors offer voice mail systems separate from their OA systems, none are yet integrated enough to offer voice-annotated text — the ability to send voice and text documents as one unit.

Personal computers offer another approach to the multifunction workstation. Today's integrated packages, such as Lotus Development Corp.'s 1-2-3 and Context Management Systems, Inc.'s MBA, are beginning to offer the ability to transfer information from one software package to another. People who buy personal computers often add a WP capability shortly thereafter, and most personal computers have very good business graphics capabilities. In addition, some electronic mail networks are geared to personal computers.

The major functions that personal computers lack are voice, administrative functions and a WP capability that is as fully functional and user-friendly as dedicated WP offerings. But the WP they do offer is adequate for the limited needs of many users.

The Compass computer from Grid Systems Corp. is one example of a personal computer with integrated packages. It is also portable; it fits in a briefcase. The Grid concept is one of standardization across software packages. Grid's Compass offers WP, spreadsheet, business graphics, a data base and even an automatic Rolodex. All the software is built around 14 basic commands — once you learn one package, the others are very simple to pick up, with almost no instruction. Grid has also made it very easy to move information from the data base to graphics to WP. The utilities are not totally transparent, but in some cases they require only one command. A telephone receiver can be hooked into the system for dial-up into outside time-share services, but the system itself does not have any voice storage capability. The Compass has recently become more portable with the addition of a light (five-pound) floppy disk drive about half the size of the main unit.

Very few telephone-based workstations are on the market today, but that is changing rapidly. Mitel, Inc., in Canada, and Northern Telecom Systems Corp. have recent products and soon probably American Bell will join the party. Mitel's Kontac executive workstation is still in beta test, but it gives an idea of what's ahead. The current release combines voice mail features with executive telephone capabilities such as conference calling and speakerphone. It can also act as a dumb terminal to outside time-share networks. Spreadsheet, WP and a Basic language programming package will soon be added.

Very little has been heard in this area from AT&T. However, that doesn't mean they aren't working on an executive workstation. At Bell Laboratories, a number of people have the Executive Planning Information and Communications System (Epic) workstation. The system has a number of function keys, so it is seldom necessary to keyboard. Electronic mail and voice mail are also available on this Unix-based system. It also offers an interface to both corporate DP and outside time-share services. Bell is working on voice annotation.

Recently, we have begun to see a new type of workstation, represented by Xerox Corp.'s Star and Apple Computer, Inc.'s Lisa. These workstations use a different approach to the presentation of information. With Star, Xerox added new words to our vocabulary: mouse, property sheets, icon and desktop. Their bit-mapped screens have true "what you see is what you get" functionality, with changing typestyles and size. There is no need to print a copy to make sure how the final output will look. With the mouse to control cursor movement and icons representing both documents and system components, most functions are performed by simply pointing and moving icons rather than typing mnemonic commands or menu responses.

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After you have set up your desktop (personal user default conditions), the appropriate icons remain and reappear whenever you sign on to the system. In fact, with Star and Lisa you can create a messy desktop of iconic images and feel right at home. Both Star and Lisa have excellent graphics and, on Lisa, you can draw free-form graphics with the mouse.

However, neither offers a voice component, and the software is excruciatingly slow to perform several functions (such as horizontal scroll on Lisa).

It is important to understand that our principal workstation cannot exist unaided. To function, it must be connected to a system that provides it with the information to manipulate. This means that the principal workstation should have connections into mainframe DP for access to transaction systems, be linked with other workstations for administrative functions and also be able to communicate to outside services.

Within the company, the network of workstations may be wired together by means of a computerized private automated branch exchange, a mainframe-controlled network or perhaps a local-area network. Outside links will of necessity be handled by computerized telephone systems. These links may be into outside information resource centers or into videotex and other broadcast services.

All these functions and features don't mean much, however, if we don't use them with a goal in mind — that of enhancing professional productivity and ultimately adding to bottom-line profits. With executive workstations we can begin to eliminate the stacks of redundant information generated by manual systems.

To become truly effective, however, we must also rethink some basics of our present-day office structure. Executive workstations *will* change the nature of work; they must, if they are used effectively. Executives will take on support tasks like filing, and, through personal computing, support people may take on decision-making tasks. The ability to communicate easily across departmental lines may affect organizational structure.

Most important of all, the advent of the executive workstation will force a complete rethinking of the information structure of the company — and that means corporate DP. Effective use of an executive workstation requires integration with on-line corporate data, unfortunately, however, too much of the relevant information still exists in a batch environment. It would be almost suicide to give top executives workstations, raise their expectations about interface with corporate data and then frustrate them with the inability to get at the information they need.

How does a company choose from the various hardware choices and avoid the pitfalls of executive frustration? It can follow two rules: Choose equipment that meets functional needs, and plan carefully. No executive workstation today has all of the functions on our ideal shopping list, but several should meet your present and near-future functional needs.

Finally, the OA, DP and communications groups must jointly plan an integrated approach to implementation. Only then will the executive gain an effective tool to aid in the creation, manipulation and communication of that important corporate asset — information. OA

Wilk is a manager in the Chicago Management Information Consulting Division of Arthur Andersen & Co.

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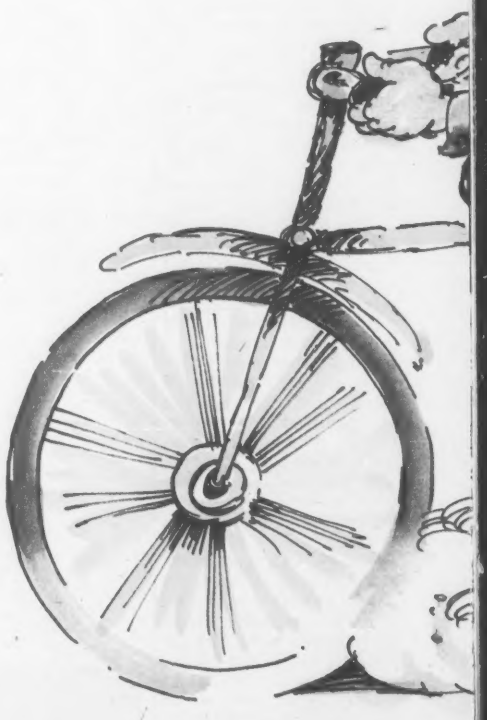
Peddling

The portable computer is attracting interest and not just for its portability. Price and growing capabilities are seen as increasingly important assets.

By Glenn Rifkin

As the personal computer finds its way to the desks of corporate America, a new and perhaps more enticing bit of technology is already at the door. The portable computer, armed with impressive power, memory and price tag, may become a formidable competitor in the battle for prominence in the white-collar suite. Adam Osborne started the trend two years ago by unveiling the immediately successful Osborne I. This 23-pound all-in-one machine folds like a suitcase and offers a five-inch CRT screen along with an eye-opening price tag of



Portables

$1,795. Although the Osborne Computer Corp. sold more than 8,000 machines in the first year alone, industry watchers were skeptical about the viability of portables. They questioned whether such a device truly served a need and if indeed something weighing nearly 25 pounds was portable at all. Despite the doomsayers, the Osborne I continued to flourish. Its success caught the attention of a growing number of followers who have created a variety of portables that have already or are just about to hit the market. Whether the computing marketplace is completely sold on these new machines remains to be seen. The manufacturers of portables, however, believe they have targeted a need and have the capability to fill it. Indeed, portables mark a major evolutionary step in computing, and their impact

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may become a significant one. Within the glass-enclosed, sterile computer centers of the 1950s and '60s, white-smocked technicians walked softly around the vacuum-tube giants. Today's rugged little portables are taking computing capabilities to the home and on the road. The sight of a professional hard at work by the hotel pool or on the backyard patio is not fantasy anymore.

Portables also have dramatic connotations for the office. Richard Dalton, president of Keep/Track Corp., a consulting firm in Corte Madera, Calif., spoke to this point at the recent Office Automation Conference in Philadelphia. "The fixed-location 'office' will no longer be as necessary, and for many workers it won't even be desirable. Part of this evolution will be made possible with the use of portable workstations, linked to other systems when information or communications is needed and [used] as local data base/scratch pad/computers the rest of the time."

Surprisingly, portability is not always the key issue for these products. Price, comparative capabilities and uses other than as an on-the-road computer are piquing buyer interest. A range of products have evolved under the umbrella term "portable computer." Pocket computers, no larger than pocket calculators, have infiltrated the marketplace as have notebook-size units such as the Timex-Sinclair 1000. The great limitations on both the power and memory of these units keep them in the hobbyist realm and generally out of the office environment.

The larger computers that boast gobs of power and memory, such as the Osbornes, Non-Linear Systems, Inc.'s Kaypro II, Compaq Computer Corp.'s Portable, Grid System Corp.'s Compass, the Attache from Otrona Advanced Systems, Inc. and many others, fill out the higher echelon of machines that fall into the portable range.

Although the portable computer market is merely in its infancy, a range of capabilities, weights and prices have already emerged. From the low-priced, somewhat bulky Osborne to the sleek, 10-pound, $9,000 Grid Compass, the portable sales shelf is stocked with options for the prospective individual and corporate user. And, as one vendor put it, "we'll soon see an even better portable product without sacrificing functionality or performance."

As the products themselves are getting smaller, the market is exploding, according to Future Computing, Inc., a Richardson, Texas, consulting firm. In 1980 a mere 5,000 portables were sold, bringing in revenues of $15 million. By 1986, Future Computing predicted, sales will total nearly $2 billion (820,000 units). The major question facing portable computer manufacturers, which must contend with such giants as IBM, Digital Equipment Corp. and Apple Computer, Inc. for the personal computer market, is where to position their products. Can the portable push the Decmates, Apples and IBM PCs off the professional's desk, or will it simply sit by the door, ready to be transported home or on business trips? Since no one has jumped up with an all-encompassing solution, vendors are offering their own suggestions.

"We see ourselves competing in a different arena from that of the portables," said John Ellenby, founder and chairman of the Mountain View, Calif., firm that produces the innovative Grid Compass. "We're competing with management workstations such as Xerox Corp.'s Star or the Apple Lisa. We have the power and software capabilities of those systems plus the portability. As management use of com-

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puters increases, portability will be a requirement."

Of course, Grid has encountered a unique problem since the Compass was unveiled a year ago. Called "the Porsche of personal computers" by *Business Week*, the Compass produced both admiration and confusion in the marketplace. As a portable, it was nearly five times the cost of the Osborne, which turned off that market; yet at the same time, it was not recognized as a management workstation.

"We definitely need to articulate our position better in the marketplace," Ellenby admitted. "We're a systems company and we intend to find a niche in the professional management group."

While Grid seeks an effective marketing strategy, the other portable vendors have gravitated to a much lower price range of $2,000 to $4,000. In fact, the portable marketplace is growing so rapidly that it is already breaking down into subcategories that have yet to be defined, according to Aaron Goldberg, research manager of information systems, for International Data Corp. (IDC), a research firm based in Framingham, Mass.

"There are a number of ways to break it down," Goldberg said. "It can be done by weight, by 8-bit or 16-bit, or by flat display vs. CRT. The market has yet to choose a way to define it."

Thomas R. Billadeau, president of Office Systems Consulting Group in Cambridge, Mass., added, "They should be broken down into portables and transportables. Portable is anything that weighs less than 20 pounds. Transportable is anything over that. Some of these supposed 'portables' won't even fit under an airline seat."

Although portability is one key issue in the looming battle of these new wonder machines, it is not the only key issue among end users, according to both vendors and industry analysts.

"Portability is not the big concern," said Harry White, vice-president of marketing for Access Matrix Corp., a San Jose, Calif., computer manufacturer whose Access Matrix portable has just hit the market. "The low price, the small package and the total integration of the system are what will sell the portable computer. The integration of hardware and software and all the peripherals make it easy to buy. It involves just one decision instead of several."

"Price is the issue," stated Rod Canion, president of Compaq, in Houston, Texas. The company's Compaq Portable, a 16-bit IBM-compatible machine priced under $3,000, has become an early favorite in the young market (even Donny Osmond and rock stars Hall and Oates have purchased the Compaq). "The technology available to Grid was there for us, but we knew that the entry-level price had to be under $3,000 in order to attract a mass market."

"The portable marketplace is growing so rapidly that it is already breaking down into subcategories that have yet to be defined."

End users tend to agree.

Stephen Keese, a member of the office automation department at John Hancock Life Insurance Co. in Boston, said, "I spent a year looking for a personal computer and I settled on the Osborne I. The major reason was price. For a complete system with software, there was nothing close."

Portables — especially those with built-in printers such as the Access Matrix and the DOT from Computer Devices, Inc., of Burlington, Mass. — have a great attraction for the home user. However, the professional or management user may prove to be a tougher sale.

Analyst Billadeau was skeptical. "The products out there today are frankly not useful to anybody. The Grid is a nice little system, but it's too expensive. No one is going to pay that price. The screens on the portables are virtually unreadable and the software is very crude when measured against the personal computers."

Others are a bit more optimistic. Many, like Goldberg of IDC, believe that managers in the mid-

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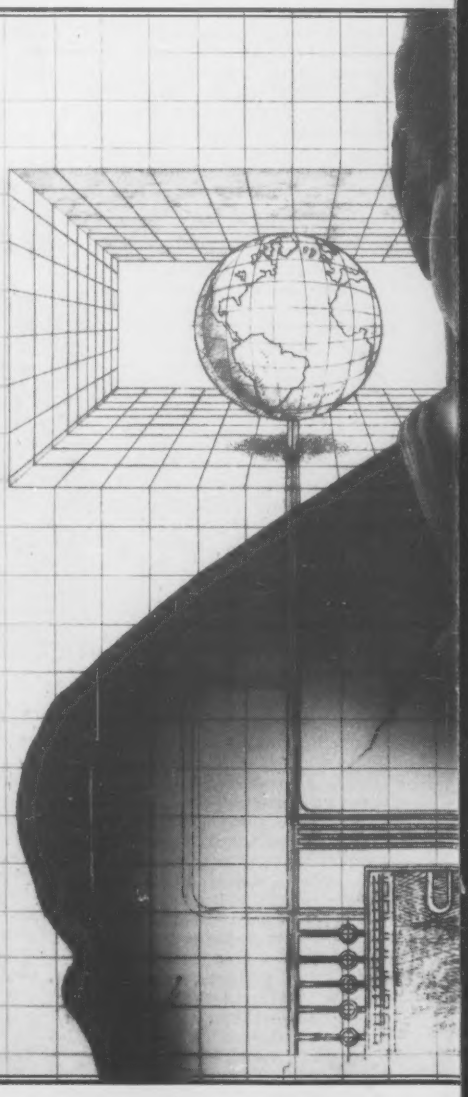

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middle to upper levels will form a potent marketplace, especially those with personal computers already in the office.

"The manager who already understands how to use a computer will be more likely to get approval to have a second, portable personal computer," Goldberg explained. "They will be the ones worthy, in the eyes of the organization, of having two computers so they can be productive at home or traveling. Some places may want to run a pool of portables so that managers can share them, but I doubt a lot of companies are that organized yet."

The portables have made a favorable impression on individual users such as Keese. Keese was so enthusiastic about his Osborne I, in fact, that he went out and purchased a second portable, a Telcon Industries, Inc. Zorba.

"The Zorba has greater disk storage and a larger screen than the Osborne," Keese said. "It is also two pounds lighter. But I still like the physical design of the Osborne better. It's useful for me to know which machines are out there. I have friends with other portables, such as the Attache, and they swear by them. I keep one at the office and one at home, and they provide the convenience of being able to work when and where I want."

"The vision of a corporate officer ensconced happily in first class with his portable, Visicalcing his way across America, may in fact be overly optimistic."

The vision of a corporate officer ensconced happily in first class with his portable, Visicalcing his way across America, may, in fact, be overly optimistic. (Indeed, the Federal Aviation Administration [FAA] has forbidden the use of electronic devices on commercial airlines because of potential interference with navigational equipment. The FAA points out, however, that permission to use computer devices on commercial flights has been left to the discretion of the individual airlines). Although some users may choose to travel with their Attaches or DOTs, vendor statements indicate they expect the majority of users to employ the downsize machines within the office, to take up less desk space and for meetings down the hall.

"We think the portable computer will be a lot like the 19-inch portable television," explained Seaforth Lyle, president of Computer Devices. "It's easy to move if you want to, but it's not really for porting around. We don't expect a lot of executives to take them home. The middle managers, however, will definitely take them home to continue work they started at the office. They're our target market."

"The compact size is the single best factor that we have seen in the early stages of usage," said Kitty Maffei, manager of advanced office systems for Standard Oil of California, which is a beta-test site for the Grid Compass. "Most personal computers overwhelm the desk. The Grid is so unobtrusive that it fits in perfectly in the work area."

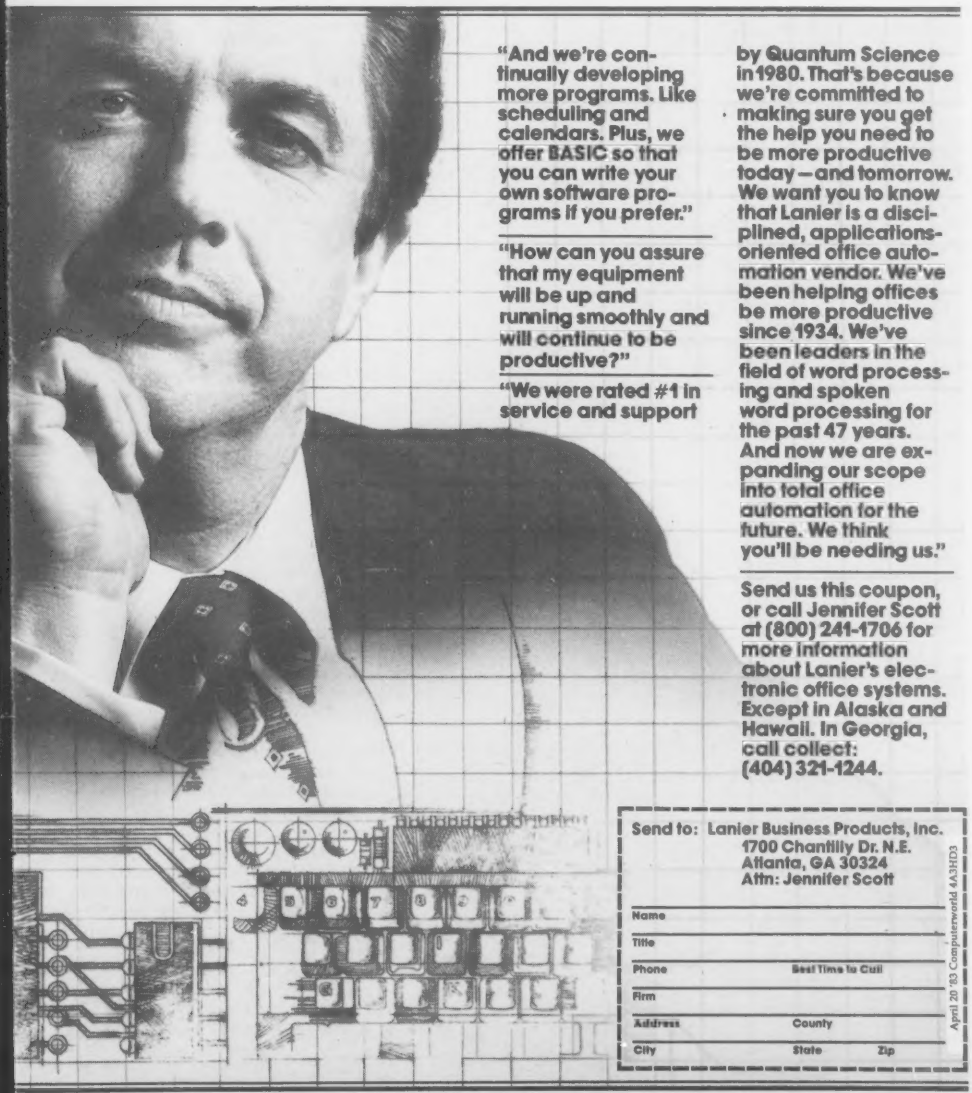
The portables are coming off the assembly line with an impressive amount of power and memory — many are 16-bit, with up to 320K bytes of memory, integrated software and built-in modems. What, then, is keeping them from replacing personal computers completely? Depending on whom you ask, the answer to that question varies.

According to IDC's Goldberg, it is unlikely that portables will eventually merge with personal computers. One reason is screen size — the 5-in. to 7-in. displays with fewer lines and columns are tough on the eyes. Another is that the personal computers themselves are being downsized to fit more easily on the desktop. There is also the question of portable compatibility with a large network of nonportable personal computers.

Others, like Jamie Zartman, product manager of Otrona, the Boulder, Colo., firm that manufactures the Attache, said they believe just the opposite.

"I think as the portables improve both in price and functiona-

"Glad you asked."
Wes Cantrell, President, Lanier Business Products, Inc.



"And we're continually developing more programs. Like scheduling and calendars. Plus, we offer BASIC so that you can write your own software programs if you prefer."

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A Portable Sampler

The portable computer market is expanding nearly as rapidly as the desktop market. Though users are confronted by an endless array of pocket and notebook-size portables, most now lack the power and memory to be considered widespread additions to the work place.

The following is simply a representative sampling of some of the portable computers currently available and is not meant to be a complete list.

Access Matrix — Eight-bit Zilog, Inc. Z80 microprocessor, 64K bytes of random-access memory (RAM), 7-in. diagonal amber display with full 80-char. by 25-line screen, detachable full Ascii keyboard, two 5¼-in. floppy disks, built-in 80 char./sec dot matrix printer and CP/M operating system. Weight: 33 lb. Price: $2,500 for a basic configuration. Access Matrix Corp., 2159 Bering Drive, San Jose, Calif. 95131.

Compaq Portable — Sixteen-bit Intel Corp. 8088 microprocessor, IBM-compatible, 128K bytes of RAM, 9-in. diagonal screen, a 5¼-in. floppy disk drive with 320K bytes of storage, MS/DOS operating system and advanced Basic. Weight: 28 lb. Price: $2,995 for a basic configuration. Compaq Computer Corp., 12330 Perry Road, Houston, Texas 77070.

Computer Devices DOT — Sixteen-bit Intel 8088 microprocessor, IBM-compatible, up to 704K bytes of contiguously addressable RAM, 5-in.-by-9-in. display, dual 3½-in. Sony disk drives providing 287K bytes of storage, built-in 80 char. by 132-col-wide thermal printer and MS/DOS operating system. Weight: 30 lbs. Price: $2,995 for a basic configuration. Computer Devices, Inc., 25 North Ave., Burlington, Mass. 01803.

Grid Compass — Sixteen-bit Intel 8086 microprocessor, 256K bytes of RAM with an additional 256K bytes of bubble memory, 4¾-in. by 3½-in. amber electroluminescent flat display with up to 80 char. by 24 line, integrated modem with modular phone jack interface, 57-key standard keyboard, integrated software, Compass' Ingrid operating system and MS/DOS operating system, portable 360K-byte diskette drive and 10M-byte hard disk/360K-byte floppy disk storage system. Weight: 10 lbs. Price: $8,150 for a basic configuration. Grid Systems Corp., 2535 Garcia Ave., Mountain View, Calif. 94043.

Kaypro II — Eight-bit Z80 microprocessor, 64K bytes of RAM, dual 5¼-in. floppy disk drives, 9-in. CRT display with 80 char. by 24 lines, integrated software and CP/M operating system. Weight: 26 lbs. Price: $1,795 for a basic configuration. Non-Linear Systems, Inc., 533 Stevens Ave., Solana Beach, Calif. 92075.

Osborne I — Eight-bit Z80 microprocessor, 64K bytes of RAM, dual 5¼-in. floppy disk drives, 5-in. CRT display with 52 char. by 24 lines, integrated software and CP/M operating system. Weight: 23 lbs. Price: $1,795 for a basic configuration. Osborne Computer Corp., 26500 Corporate Ave., Hayward, Calif. 94545.

Osborne Executive — Just unveiled this week, the Executive addresses Osborne's most frequently heard complaint: screen size. The Executive has a 7-in. amber CRT display with an 80 char. column size. The unit, which retains the same packaging as the Osborne I, has been "redesigned from the ground up," according to product manager Tom Hayes.

The Executive has a Z80 8-bit microprocessor, 128K bytes of memory, integrated software, universal terminal emulation and CP/M Plus operating system. Weight: 25 lbs. Price: $2,495. Osborne also introduced the Executive II, a 16-bit version of the Executive, which includes an Intel Corp. 8088 coprocessor with independent 128K bytes of memory (expandable to 256K bytes). The Executive II costs $3,195.

Otrona Attache — Eight-bit Z80A microprocessor, 64K bytes of RAM, dual 5¼-in. disk drives with 360K bytes of storage, 5½-in. CRT display with 80 char. by 24 lines, integrated software and CP/M operating system. Weight: 18 lbs. Price: $3,995 for a basic configuration. Otrona Advanced Systems Corp., 4755 Walnut St., Boulder, Colo. 80301.

Zorba — Eight-bit Z80A microprocessor, 64K bytes of RAM, dual 400K-byte floppy disk drives, 7-in. CRT display with 80 char. by 25 lines, CP/M operating system and integrated software. Weight: 22 lbs. Price: $1,995 for a basic configuration. Telcon Industries, Inc., 1401 N.W. 69 St., Fort Lauderdale, Fla. 33309.

lity, a lot of people will opt for them," Zartman pointed out. "It doesn't leave a big footprint on my desk and I can take it home. The office environment is sometimes a big liability with constant interruptions. You can get a lot more done at home sometimes.

"I also see portables as a definite fit with office automation. They will transcend all levels of the organization as long as you are not sacrificing any functionality. We feel strongly that you shouldn't have to sacrifice any functionality with the portable. If that is the case, portables will bring the realization of the virtual office, the use of remote work sites. You can have access to your data base when and where you need it," Zartman said.

Ellenby of Grid agreed.

"As managers start to become more and more comfortable with these tools," he said, "they will need them wherever they do work. They'll travel to where the problems are and bring these with them."

Ultimately, the traveling machines will have to answer the test of time. The portable is a relatively recent addition to the personal computer marketplace, and the jury has not yet reached a verdict on whether the units can withstand the rigors of excessive movement. Can the disk drives and chips cope with the banging of a life as baggage? Will condensation from taking a unit out in the extreme heat or cold and back inside again cause headaches for man and machine? Will batteries be developed powerful enough to run complicated software for reasonable lengths of time? Can the weight be reduced without sacrificing screen and keyboard quality? Will there be a low-cost access to local-area networks?

Before welcoming the portable with open arms, most industry analysts would like the answers to these questions.

"The market is miniscule right now," Billadeau stated. "There is almost no saturation to speak of. But the market is there if the product and price are right. We may see something this year. The people who have done some innovative things with workstations are certainly capable of building an acceptable portable; I mean, if Apple can build the Lisa, they can build a good portable. Grid has a good idea, but the question is how much are people willing to pay?"

Canion of Compaq said he felt the product will, indeed, fit the market. "IBM sees the portable market as a niche market, one they come back to. We see it as a much more significant part of the total market. Portables will have a big impact in office automation. The problems they solve today give them a shot at being the computer used to automate the office." OA

Rifkin is a staff writer for Computerworld OA.

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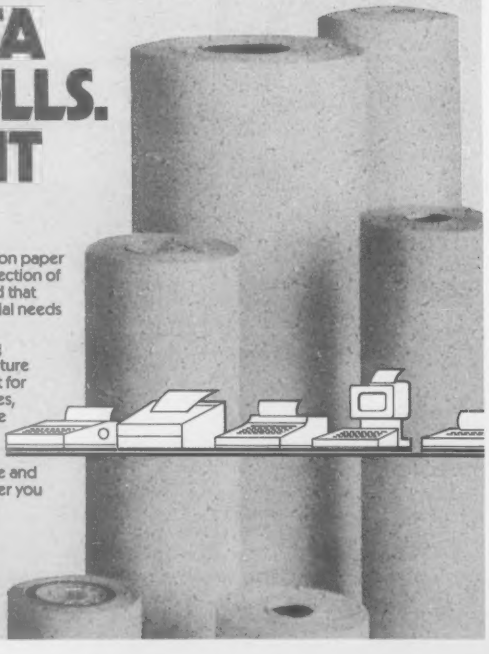

The High Cost Of Communications

Many organizations are finding that their communications costs are out of control. What can be done to hold spending down?

By Daniel J. O'Connell

The foundation of office automation is communications. As voice, data, text and video merge into integrated networks, users should begin taking positive action to control and manage the burgeoning costs and requirements for effective voice communications. Because at least 75% (80% in the UK and Europe) of all communications costs are associated with voice, tactical planning of voice communications networks helps users to control these costs. As one senior corporate planner recently remarked, "The glamor may be in strategic planning for multifunction networks, but the dollar savings for the present are in voice networks."

Corporations are realizing the benefits of following a phased approach to planning their communications needs and subsequent costs. For voice communications networks, tactical planning consists of four distinct phases: planning to plan, awareness building, requirements definition and plan development and verification.

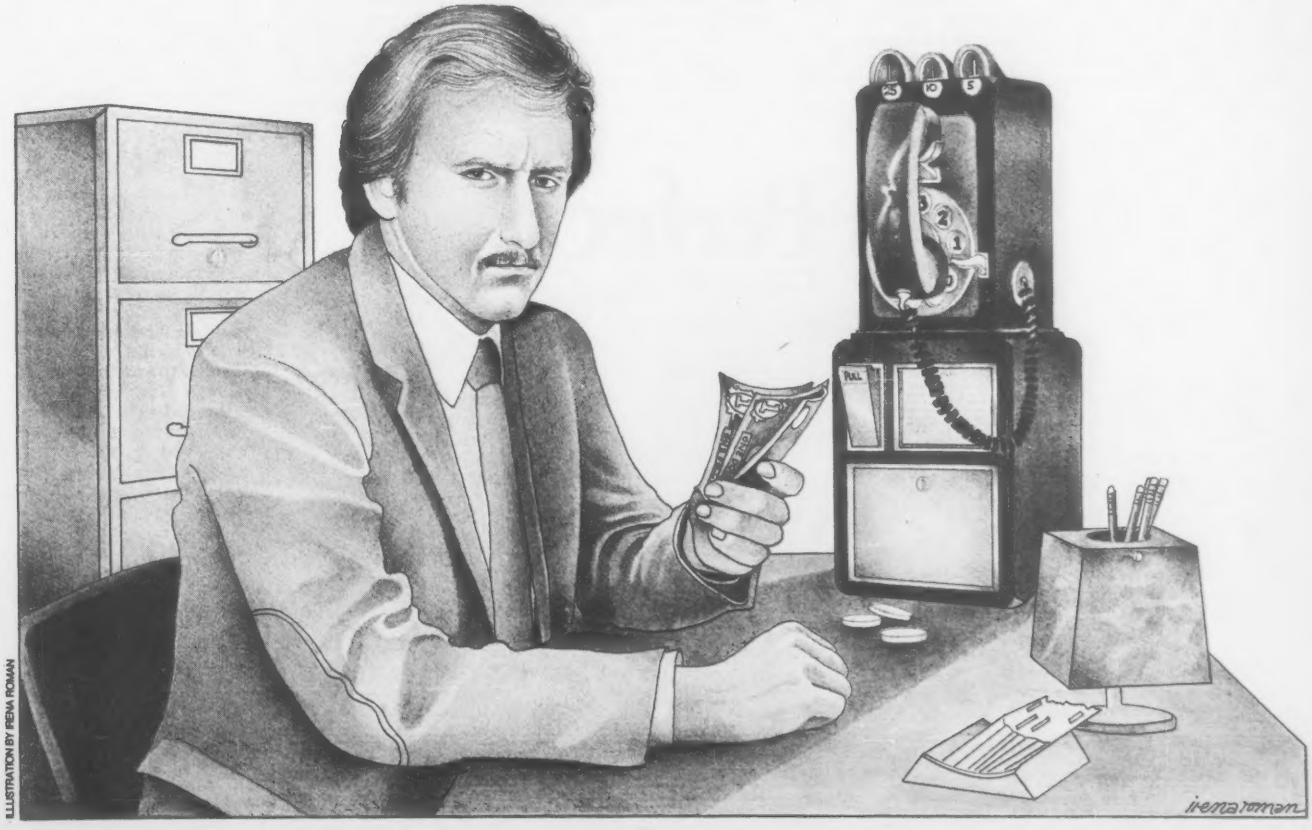

ILLUSTRATION BY IRENA ROMAN

Planning to Plan: The initial step in tactical cost planning is determining the composition of the planning team. Although many organizations have successfully used a senior member of DP or a member of the user community, best results are achieved by using a telecommunications person. Other members of the team are selected from DP, data communications, a large corporate user, one or two representatives from major regional locations, possibly a consultant and clerical assistance.

The planning team reports to a senior-level advisory group (usually referred to as a steering committee), which is available throughout the planning cycle for review and direction and provides a senior corporate view. The steering committee typically consists of five to seven senior executives who have responsibility for establishing priorities and approving the plan.

Two natural questions arise: How long should we take to do the tactical plan, and how far into the future should the plan cover?

Development of the plan depends on the size of the corporation. Typically larger organizations consider nine to 12 months as reasonable, but it can be done in three to six months. A plan is an action document, not a work of art. Putting a reasonable document out for serious discussion and helpful criticism (the straw-man concept) tends to produce better results, more involvement and improved acceptance through the iterative process than would a "final plan" that takes a year to develop. Some steering committees will approve the latter from boredom if nothing else.

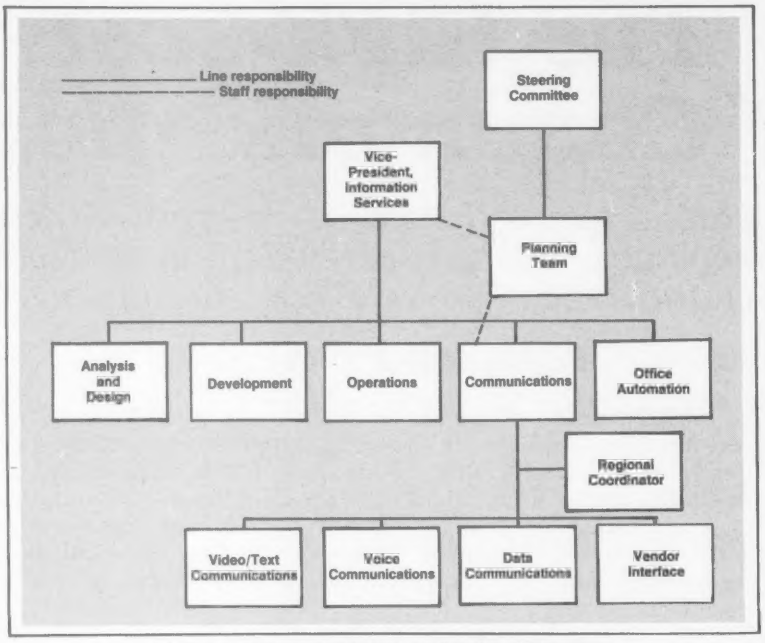

Figure 1. Recommended Organizational Structure

It is reasonable to expect a tactical plan to cover a planning horizon of two (but not more than three) years. Longer than that, we are into the area of strategic planning; shorter than that, we are into the annual budget cycle.

The tactical plan considers goals and objectives as the foundation for planning. Developing goals and objectives applicable to communications networks requires knowledge of the corporation as a business entity and encompasses activities such as:

- Understanding corporate goals and objectives.
- Reviewing relevant business and automation plans.
- Researching organization structure and reporting responsibilities.
- Interviewing key executives to determine or verify corporate policies.
- Approving goals and objectives by the steering committee.

Broad objectives, like cost-effective and reliable communications, will surface. More meaningful statements, such as decentralized control of communications or integration of voice and data by 1985, are preferred.

Objectives provide a direction to the planning team, signal when you have finished and give valuable measurement tools for the postimplementation review.

Major successes in the Planning-to-Plan Phase are characterized by a balanced planning team composed of users, technical experts and management; an active and involved steering committee; a valid determination of applicable objectives and promulgation to the planning team; and an acceptance and approval of outputs by the steering committee.

A recommended organizational structure that supports the planning process and the actual implementation is shown in Figure 1.

Awareness Building: The planning team now moves to concentrate on the major technologies available. The team needs to understand the basic concepts of voice communications, such as tie line, wide area telephone service (Wats), foreign exchange and other common carriers. Private branch exchanges (PBX) represent the key element in voice communications networks. PBXs promote the sharing of telephone services, thus reducing the number of external telephone lines and providing more economical telephone service. Some of the more important functions for the planning team to examine with respect to PBXs are direct inward dialing, direct department calling, automatic route selection, automatic callback and station message detail recording (SDMR).

The planning team should also familiarize themselves with voice message systems and electronic mail systems that cut down on telephone tag and improve service. Teleconferencing can also be considered within voice communications networks, but the team must not limit its exposure to technology associated only with voice. An understanding of all aspects of OA and data communications is required.

Major successes in the Awareness Building Phase are characterized by excellent knowledge of voice communications by the planning team, broad

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understanding of related technologies and recognition of the applicability of the several technologies to the planning effort.

Requirements Definition: The planning team is ready to establish a "now" position in response to the question, "Where does the organization presently stand in voice communications networks?"

This requires an inventory of telephone equipment, including PBXs, voice message systems, teleconferencing and other voice network equipment. Information is collected on quality of service, voice call distribution and unique calling requirements, incoming calls, potentials for abuse, monitoring capability, growth expectations, present voice communications costs, battery-operated telephones and number of trunks.

An inventory of existing hardware is usually accomplished through survey, billing information and random sampling. You must be even more careful today with the increasing use of modular equipment. A valuable document in determining inventory is the telephone company equipment record describing the equipment and lines rented by subscribers. Familiarity with the Universal Service Order Codes is required, because all entries in the equipment record are coded.

Collecting information on telephone usage can be a time-consuming (if not impossible) task. An invaluable aid is the availability of station message detail recording records. SMDR data is the basis of automated accounting systems and lists all aspects of telephone usage, including outgoing calls, type of call, calling station number, called number, time of call, month and day of call and duration of call.

This data can be processed to break out the information in any number of formats such as telephone expenses by extension, telephone expenses by cost center and call distribution by hour and day. Figure 2 on Page 26 is an example of a typical report.

Lack of SMDR data considerably complicates the task. One alternative is to review telephone bills. Bills routinely provide information such as the data, time, place called, telephone number called, rate explanation (direct dial, person to person and so on), telephone cost and originating telephone number. Obviously, the planning team cannot review all manual records, and therefore a sampling method must be used. Manual reports do not generally report information on tie lines so other methods involving either the caller or a central operator recording such information can be used. Similarly, Wats information is limited to hours of usage. Some organizations even request callers to fill out call forms to record calls. This is a sure way to build up resentment from the start.

Upon completion of the inventory, the planning team can evaluate shortfalls in the existing system. One method that works well is that of mapping the present communications network to the objectives to determine which objectives are not presently being met. Another method is to use network computer models which permit the input of usage data and provide the number and types of lines as an output. Some of these models run on personal computers, so the planning team does not have to be concerned with mainframe computer usage. The planning team will also use questionnaires and conduct personal interviews to determine future requirements.

Questionnaires are used below the department management level and provide a convenient method for collecting information from a representative sample of users. The planner should develop unbiased questionnaires and address how to have people return them. This can be done by designing questionnaires that are short (maximum of three pages), easy to fill out, follow a logical order, do not create apprehension and provide a reward for returning the questionnaire.

Questionnaires provide requirements information on levels of satisfaction with present service, special telephone features needed and special features. Typically, questionnaires are analyzed according to usage (heavy, medium and light users) in order to provide proper weighting of the results.

After tabulating the results of the questionnaire, the planners are prepared to conduct the interviews. Planners will have a reasonable idea of requirements before starting the interviews and can stimulate the executive's thinking by explaining the objectives, existing system, shortfalls, technology available and the results of the questionnaires.

Interviews generally involve departmental executives and above. Executives will provide input on the present system, shortfalls and their effects on business, future directions of growth, personnel considerations in implementation of newer technologies, impact of

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voice communications on the decision-making process, new lines of business that will require support and critical factors for evaluating the tactical plan. Interviews not only provide input on requirements, but also tend to foster acceptance of the planning process because executives recognize they are involved.

The planning team needs to examine requirements to see if they are valid and to separate needs from wishes. Some supposedly hard requirements will fall out during the interviews, but most will have to undergo the rigors of a cost-benefit analysis. This will involve costing out the requirement and costing out the benefits over time. Costs and benefits are then compared by means of a net present value technique such as discounted cash flow analysis.

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Billing Period: 01/1/83 — **Run Date: 2/7/83** — **Page No. 57**

Distribution by Day			Distribution by Hour		
Date	Calls	Minutes	Hour	Calls	Minutes
Jan. 1	35	47.2	12 a.m.	23	47.3
Jan. 2	735	2,437.8	1 a.m.	49	57.3
Jan. 3	833	2,616.0	2 a.m.	20	18.7

Figure 2. Typical SMDR Report.

Those requirements that survive the cost-benefit analysis need to be placed in a phased schedule for implementation, which will involve priority setting. This is the function of the steering committee, and the planning team provides information on which decisions are based in areas such as cost benefit, urgency and relation to schedule.

Major successes in the Requirements Definition Phase are characterized by:

- Logical approach to establishing a "now" position.
- Correct mapping of the "now" position to goals and objectives to determine shortfalls.
- Sound preparation for interviewing.
- Strong executive and user involvement and acceptance of the planning premises.
- Realistic cost-benefit analysis.
- Reasonable priority setting by the steering committee.
- Acceptance and approval of outputs by the steering committee.

Plan Development: Upon completion of the Requirements Definition Phase, the planning team reviews the entire process, compartmentalizes the results and prepares the tactical plan. Generally accepted categories addressed in the tactical plan for voice communications networks are objectives, present telephone network, shortfalls, requirements definition, technology availability, technology projections, new telephone network, phased implementation schedule and costs.

Many organizations evaluate their network plan against certain criteria. This is an excellent idea, and the following are some recommended criteria: Does the tactical plan meet the stated objectives? Does the tactical plan provide for the eventual integration of voice, data, video and text? Does the plan represent the entire organization and not just the major users? Is the plan logical and reasonable from both a requirements standpoint and cost view? Is the technology available to implement the plan? Are the necessary skills available within the organization?

Upon completion and approval of the plan, the organization will be concerned with actions such as writing the request for proposals, evaluating the responses, implementing the phased tactical plan and reviewing the results in a series of postimplementation reviews.

Savings of 30% over existing costs with no degradation of service are quite common as a result of careful planning. More important, it provides an overall direction to the organization and avoids the crisis-management syndrome, which is so disruptive.

Besides, wouldn't you really rather be driving into the future with a road map than stopping at every corner to ask directions? OA

O'Connell is a senior consultant at International Management Services, Inc., in Framingham, Mass.

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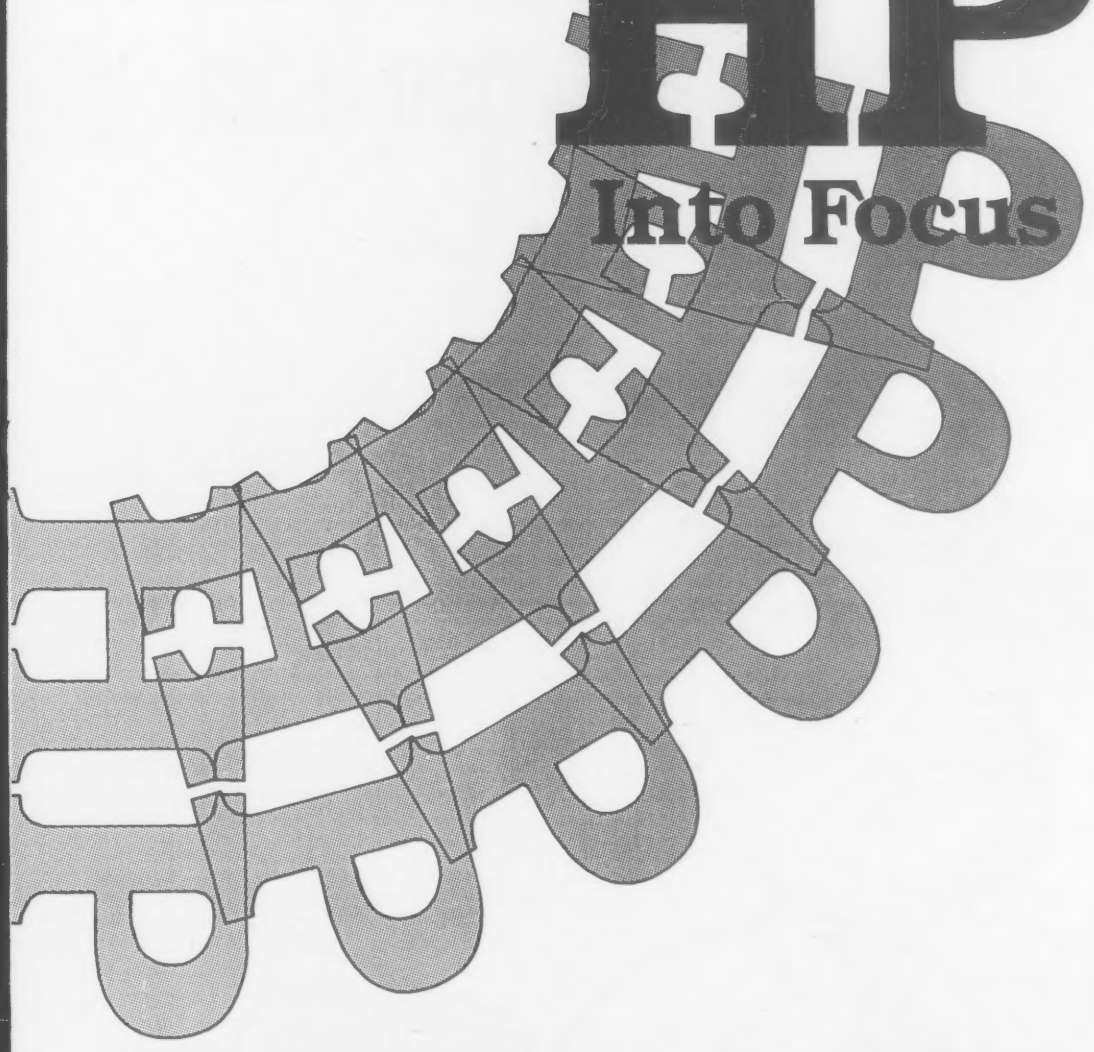
Putting HP Into Focus



By Ann Dooley

Hewlett-Packard Co., a long-time leader in electronic measuring devices and a major data processing vendor, claims it is offering a solution for office automation, but both the industry and HP, itself, seem unclear as to what that really means.

Although HP markets its OA system as the "Interactive Office," lack of communications capabilities has been a nagging problem for the company. HP is offering some of the leading-edge products in certain segments of the industry, but, so far, it has failed to tie those products into a cohesive OA system.

The company has, however, built up an excellent reputation among its users and even among non-HP users. In a recent poll of Fortune 200 companies, HP came in second as the most admired company, losing in a dead heat only to IBM. In the same poll, the company took first place for the way it dealt with its people, particularly in its ability to attract, develop and keep talented employees. High scores were also achieved for innovativeness, management, investment value and quality of its products.

In the same vein, a 1982 survey rating 50 OA vendors gave highest marks to HP. Conducted by International Data Corp., the survey of 269 managers also rated HP better than

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Originally founded in 1939 and incorporated in 1947, Hewlett-Packard has come a long way from the time it manufactured and marketed electronic measuring instruments — at least in some ways. Currently employing 64,000 employees in 70 countries, HP is still trying to stay true to operating the "HP Way."

Known for its conservative management style, the company has been built on a decentralized entrepreneurial approach. Whether that very decentralized approach will be an asset or a liability to HP as its products and systems become more integrated is not certain. Some critics have complained that HP suffers from a disjointed approach to the industry, leaving different divisions to work on similar products resulting in redundancy and occasional incompatibility within HP's own product lines. John A. Young, president and chief executive officer, was appointed five years ago with the mandate to bring cohesiveness to the divisions, yet at the same time keep the work groups small and competitive. Some feel that these changes are threatening the entrepreneurial flavor that HP prides itself on, while others feel the company's actions have not been strong enough.

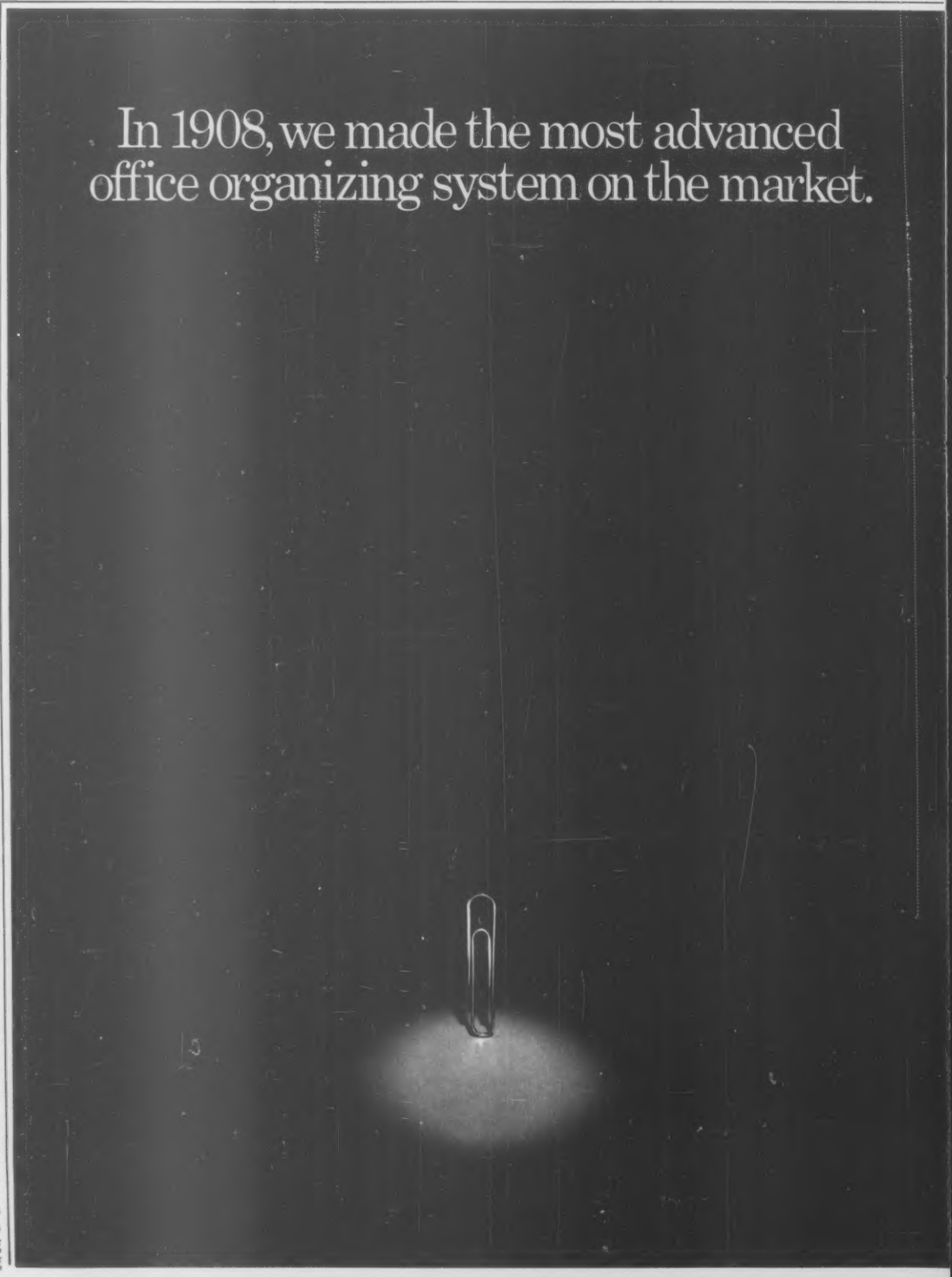
"Last year, computer-related products accounted for 52% of HP's total sales."

HP recently reorganized its computer products division by centralizing responsibility for applications software and merchandising and streamlining its operations. The action was aimed at improving HP's strategic focus, reducing confusion and achieving market recognition, Andre Schwager, general manager of the Information Networks Division explained.

According to some reports, the reorganization in one way or another has already caused some of HP's old-guard product developers and managers to leave the company. HP's internal responses to these kinds of changes may affect how successful the company will become in the quickly changing OA market.

For HP, the road to office automation was via the HP 250, the company's first product designed to operate in an office environment. It was marketed mostly to OEMs, software development firms and large end users. In 1981, HP introduced a combination of hardware and software called the Interactive Office. At the heart of the system is the HP 3000, a product that was first developed in 1974 for distributed data processing and materials management manufacturing.

Although some critics maintain that HP needs a new system to replace one introduced so long ago, HP disagrees. Bruce Woolpert, operations manager, office systems, denied that the HP 3000 is an old architecture. The system is the fifth most widely used U.S. system and continues to show excellent and improved price/performance measurements, according to Woolpert. By not switching systems, users will always have a compatible system to work from and will not have to change their program packages,



an important user concern, Woolpert noted.

HP is attempting to put all its OA pieces together as quickly as possible in order to stave off competitors making inroads on its user base. The question is whether it will be quickly enough. HP is directing more than 50% of its R&D to software, an area that was the company's highest growth area last year.

Traditionally, HP has stayed away from applications-level software. To fill the gap, the company has begun a Software Supplier Program, which encourages independent software suppliers to make cooperative marketing agreements with HP. This expands HP's applications offerings and in turn widens its customer base.

HP maintains it is a definite contender in the OA marketplace. In fact, as the company becomes increasingly computer-oriented — last year, computer related products accounted for 52% of HP's total sales and officials expect this trend to continue — it needs to maintain this postion to reflect current market trends and to stay abreast of its competitors.

HP's approach to OA, according to Schwager, a 10-year veteran with HP, is to view it as a spectrum of technology that is needed to get a job done, rather than as a sum of products. The company sees OA as coming from all parts of a company in which common functions can be extracted and then integrated. This vertical development tied together across function lines is a different approach from that of its competitors, who are addressing the issue from a communications, DP or WP format.

HP has defined its strategy as an integrated set of office capabilities designed to solve common problems for all functional areas of an office, whether they be technical or clerical.

HP recognizes that its approach to the market place has been fuzzy and indirect. End users frequently don't perceive HP to be an OA vendor, although the company considers itself in the market and is diligently working to provide an office system. HP officials are aware of the confusion over its marketing emphasis and company direction, but they see no changes for the future.

Today, HP can offer users excellent graphics, personal computing and laser printing capabilities, user-friendly systems featuring soft-key functionality and a large variety of application-specific terminals. HP is beginning to crop up on more user lists of potential OA vendors, and not just for engineering applications, according to consultant Amy Wohl.

Although HP "leaves something to be desired in integration" it is still early in the game for HP, Wohl, president of Advanced Office Concepts, noted. For personal computer offerings, Wohl ranked HP as one of the major vendors.

Other HP advantages, according to Schwager, are a firm foundation in DP, better service than many of its competitors, ease of use, reliability of products and equipment that won't become obsolete as new systems are introduced. HP's plotters and peripherals are more advanced than others in the industry, he claimed, noting that the company's Rapid language product improves the productivity of users who want to do their own programming. In the future, HP will concentrate on continued integration and decision support, according to Woolpert.

HP has surpassed other vendors in offering a wide variety of applications specific terminals. As pressure mounts for a "universal terminal," however, HP has decided to begin moving toward increased functionality on one machine. There is no

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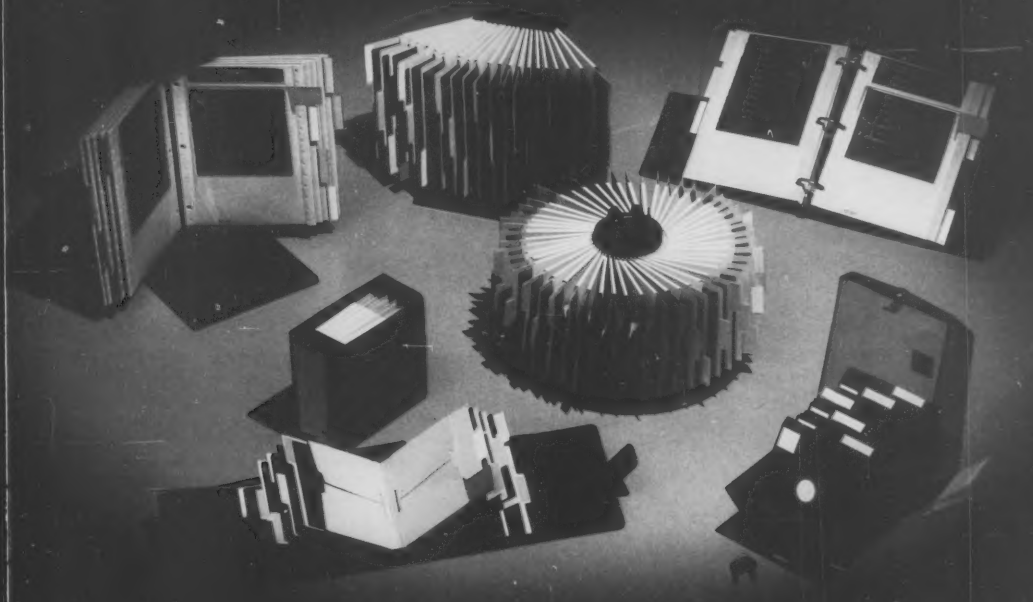

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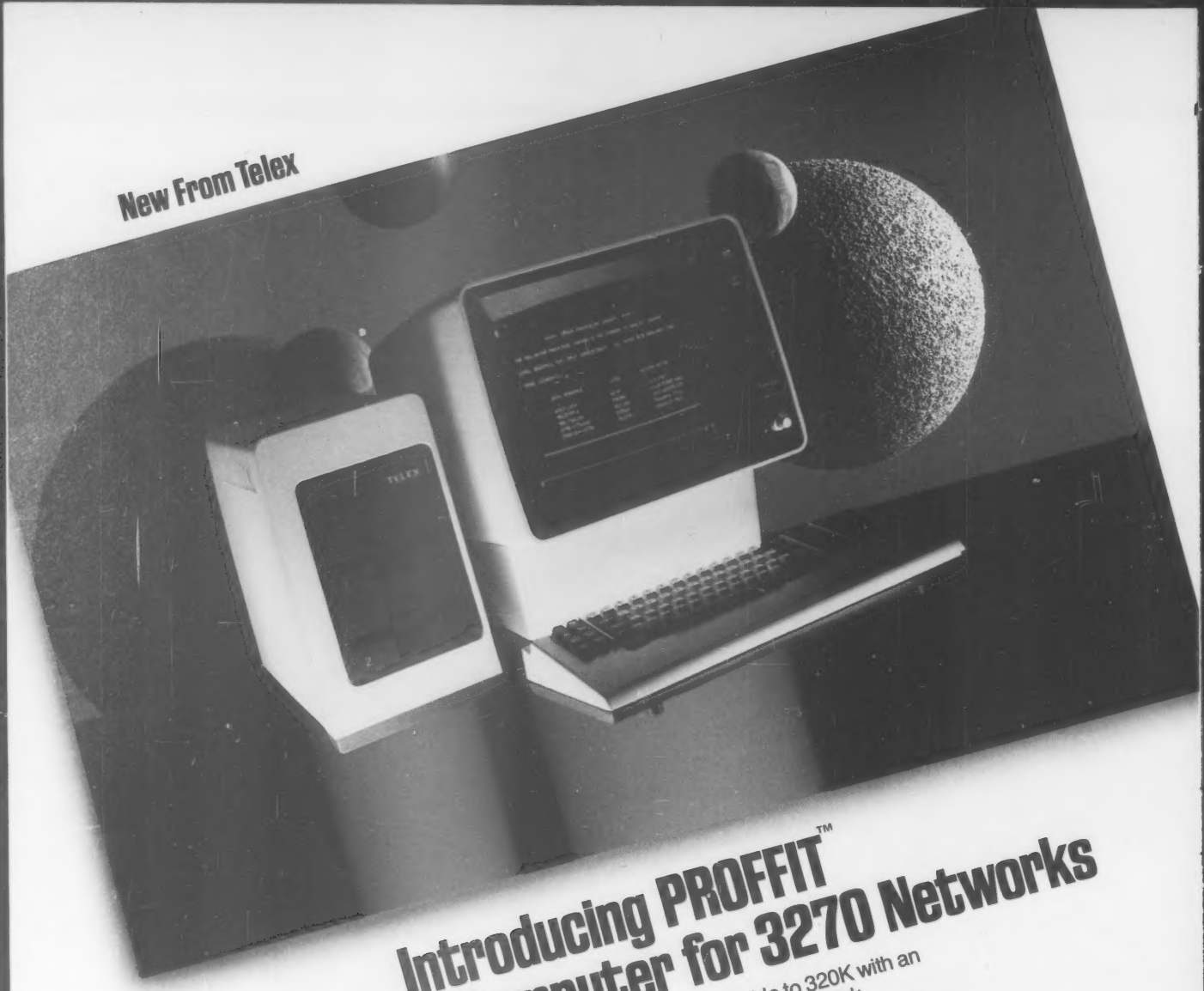

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reason to limit people any longer since the cost of memory enables more functionality to be placed in one machine, Woolpert noted.

The company has come under some criticism for its lack of an integrated system, primarily relating to its communications offerings. "HP represents a stand-alone approach to OA which is a definite weakness," Thomas Billadeau, a Boston-based consultant charged. HP, however, maintains it has ample communications capabilities and is planning for more. While it offers no local-area network of its own, it is a strong proponent of the Ethernet — IEEE local-area network standards. The company also offers IBM-emulation; private branch exchange links through Rolm, Northern Telecom and Intecom; and its own distributed network standards. It is an advocate of X.25 packet switching standards and the Systems Network Architecture operating system.

"HP has a lot going for it — excellent graphics, user-friendly products, good hardware, an outstanding reputation and a fiscally sound business base."

HP is targeting manufacturing companies in its quest for OA market share over IBM and Wang Laboratories, Inc., which it sees as its major competitors. Manufacturers have been HP's traditional customers, generating approximately 40% of the company's business computer sales. The Manufacturer's Productivity Network (MPN) is a vertical strategy complemented by HP's new Information Product Network (IPN) that deals with OA needs on an across-the-board basis by functions.

HP says it realizes its approach to end users must be different from that for DP types or the engineering users, but the company still needs to prove that it has a good understanding of the market and that its indirect approach to OA will be successful. HP went into the office market to satisfy its customer base and found it needed to deal with customers it was unfamiliar with, according to Amy Wohl. " They have not yet realized all the repercussions of OA or have fully understood the OA market or OA users needs."

Billadeau, president of The Office Systems Consulting Group, agreed. "HP is in the world DEC was in two years ago. The company wants to keep selling to science and technical users, and that is not a broad enough base. They can't expact to sell OA through OEM marketing tactics. It requires a cohesive sales/support/feedback effort."

But according to Woolpert, that's exactly what HP is going to provide. The company's new Applications Marketing Division will feature a support team for end users in 17 applications centers around the country. The centers will consist of of a product support representative, an applications systems engineer and an applications specialist or project manager. An emergency support line will also be available to users. In addition, HP is specializing its sales force and providing specific sales training for OA.

HP has weathered the recession with little debt and strong profits, unlike many of its high-flying competitors who have had the wind taken out of their sales. In fact, the company has reportedly compiled cash reserves of $400 million. With the majority of its revenues now attributable to computer products, HP in fiscal year 1982 reported a 25% gain in earnings.

Critics maintain that HP should not become too confident, however. There is still the claim that some of its hardware, like the HP 3000, is being outpaced in the fast-growing industry, and, according to Dataquest, Inc. research firm, its personal computer and medium-size business market shares have slipped. HP argues, however, that while it may have declined in the overall personal computer market, it grew in terms of the professional personal computer market.

HP has a lot going for it — excellent graphics, user-friendly products, good hardware, an outstanding reputation and a fiscally sound business base. It should be able to maintain its current user base as these companies move into OA applications, but the jury is still out on whether HP can gain new market share through its current product offerings. OA

Dooley is editor of Computerworld OA.

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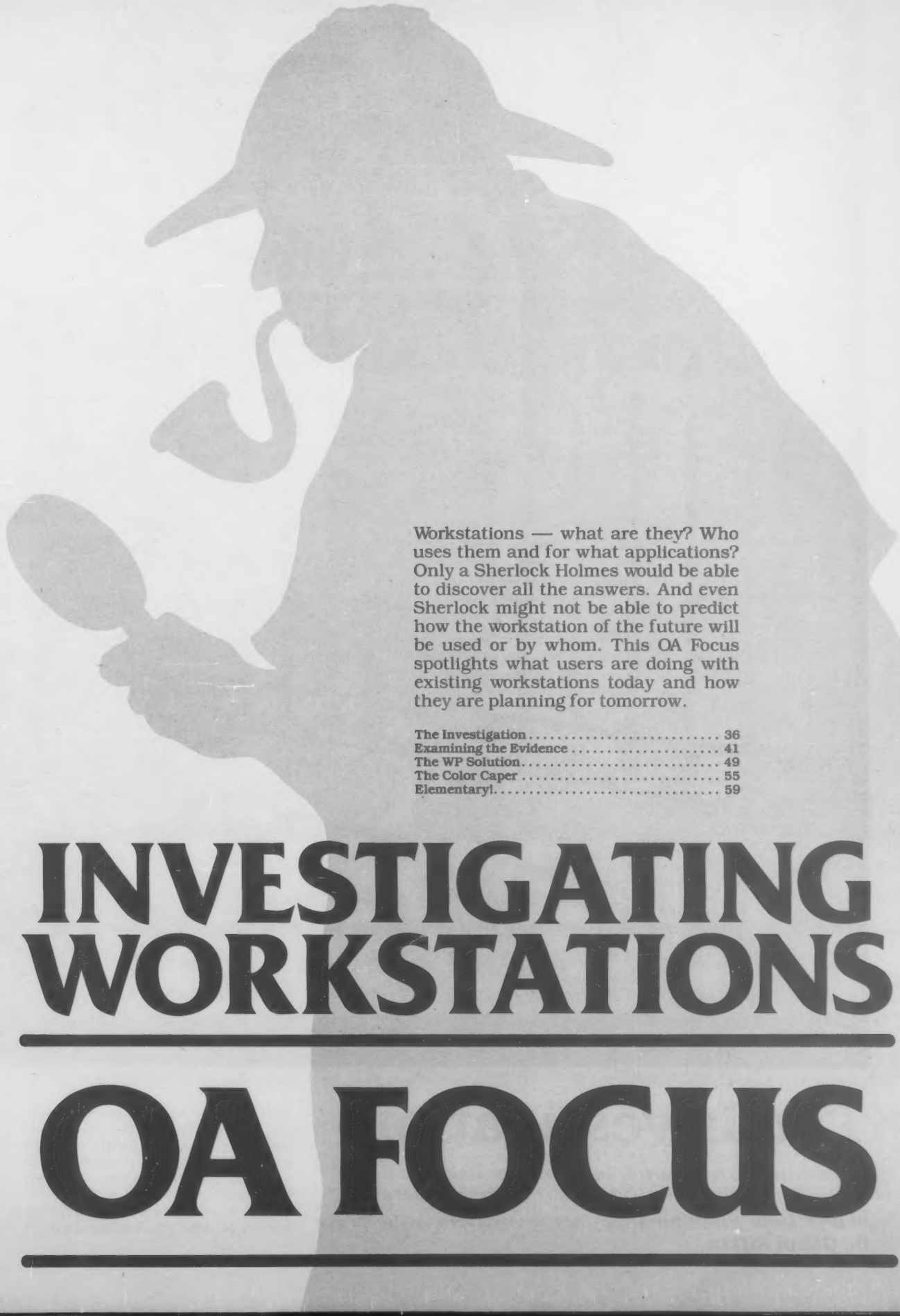

Workstations — what are they? Who uses them and for what applications? Only a Sherlock Holmes would be able to discover all the answers. And even Sherlock might not be able to predict how the workstation of the future will be used or by whom. This OA Focus spotlights what users are doing with existing workstations today and how they are planning for tomorrow.

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Examining the Evidence 41
The WP Solution 49
The Color Caper 55
Elementary! 59

INVESTIGATING WORKSTATIONS

OA FOCUS

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The Investigation

Workstations: marketing buzzword or user reality? A Computerworld OA *survey asks users to give their opinions.*

By Glenn Rifkin

Deciding how to integrate a professional workstation into the corporate environment is only slightly less perplexing than finding a common definition of the term workstation itself.

A recent *Computerworld OA* survey of data processing manag-

ers, office automation directors and technical strategy officers from around the country revealed that the concept of a professional workstation conjures up everything from "telephones, desks and pencils" to "nothing more than a sexy personal computer."

The vision of the corporate executive deeply immersed before multiple windows of textual and graphics information on his desktop CRT terminal is, for most organizations, a look to the future. The survey respondents were asked who was using the workstations, for what applications, if cost-justification was required and if any resistance occurred. According to the survey results, the professional workstation will be the subject of intense planning and analysis before it finds a permanent and widespread home in the executive suite.

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Of the organizations that are already proceeding in that direction, however, the early returns are uniformly enthusiastic.

According to a January 1982 research report on management workstations by the International Data Corp. (IDC), a Framingham, Mass. research firm, "in 1985 about 1.2 million management workstations of various types will be used by an estimated 39.7 million nonclerical white-collar workers, or by about 3%. The management market is the last frontier of the computer in business and will undoubtedly be the most difficult to settle."

While "telephones, desks and pencils" might suffice as a professional workstation to some, the generally accepted features necessary to qualify a product as a workstation include an integration of:

- Word processing.
- Data processing.
- Filing system.
- Electronic mail.
- Business graphics.
- Management support (such as calendars, tickler files and status files).
- Voice processing (for the most part, a future consideration).

While products such as Xerox Corp.'s Star and Apple Computer, Inc.'s new Lisa apparently fill all the requirements for inclusion into the category, a large proportion of DP and OA managers are only taking a peek in that direction, preferring instead to incorporate appropriate new software with existing hardware to form a hybrid workstation that answers specific needs within the organization.

"I don't see us standardizing," said Dan Picasso, manager of Advanced Office Systems for AT&T Long Lines in Morristown, N.J. "We will support our existing personal computer operating systems and use any of a hundred kinds of terminals that are already out there. I like the idea of offering a wide array of terminal gear. We have 4,200 users on our own system — the ATT Advanced Office System — and we'll be adding 3,000 more this year.

"We have managers who fear the keyboard, so they're better off with a dumb terminal. On the other end, we have people who need the personal computer with integrated word processing, statistics and graphics capabilities. The executives are the most difficult because what they want varies widely. They don't want to be spoon-fed, but as long as they can get the information, they're happy. We're migrating to a variety of workstations."

Others are looking toward a system like the Star or Lisa in the future, but are content to create workstations with their current systems. One advanced systems supervisor of a Florida-based electronics firm said, "We plan to be broad enough to include the Lisa-type system, but for now our IBM Personal Computers, with the appropriate hardware and software packages, are used as executive workstations. We have 20 systems on the director and vice-president level that offer some form of office organizational capabilities such as calendaring, word processing, spreadsheet analysis and more."

Although many large corporations and organizations, especially some banks and insurance companies, have led the way into the workstation marketplace, a majority of companies are hesitant to sail in what they consider uncharted waters. Of 25 organizations contacted in the OA survey, only five had what they termed professional workstations in place already.

"If we could find something that fits our definition of a workstation in terms of needs and costs, we'd be very interested," explained William Lape, general manager of information systems for the H.J. Heinz Co. in Pittsburgh, Pa. "Until we see a product worth investing in, we're not going to rush into anything."

Most of the companies surveyed were in the process of reviewing and analyzing internal needs on the management level and comparing those needs with the existing workstation marketplace. Although there is widespread agreement that products such as the Lisa are enticing, the MIS managers are unclear as to whether or not they want to head in that direction.

Thomas A. Hannagan, president of Hannagan & Associates, Inc., a Chaumburg, Ill.-based consulting firm, commented, "The Star and Lisa are, for the technologists, exciting to touch and see, and those products might begin to make a difference in OA. But people are more concerned about the cost-per-head of these systems, and that is one thing keeping OA from ballooning more than it has. People talk about implementation, but that dries up when they hear the cost. They are more interested in the personal computer in the $2,000 to $3,000 range than in systems for $10,000 or more."

The IDC research report asked the question: "The management workstation: Is it a rubric to sell hardware or the long-sought-after lever that will pry white-collar productivity out of the paper morass of today's office?"

Calling itself a "skeptical advocate," IDC acknowledged a "definite demand for management workstations and other tools of automation. But technology and marketplace reality fall far short of meeting the needs evidenced by the demand. At the root of this mismatch between demand and reality is the fact that in this information society, knowledge *really is* power."

According to the OA survey, getting that "power" or flow of information onto the desk of the end user will be a crucial management priority in the '80s.

"To keep a competitive edge, we've had to experiment with a number of things," stated Ricci Anderson, vice-president and technical strategies officer of the Chase Manhattan Bank in New York. "The job of the officers of the bank is to manage information. They need to get it within a certain time frame and they recognize the workstation as a tool to do that.

"The bank has been pushed to become very technically oriented. When you speak to the officers here, it isn't like talking to the Kiwanis Club. These people know what you're talking about. We'll probably purchase several Lisas in the near future and assess whether there is any value to us. We're also looking to the Fortune system. We're a huge Wang-based operation and if we can integrate Fortune with the Wang system, we may go in that direction. My role is to pull all the pieces together."

"Personal productivity is our main objective," agreed David Hatch, assistant vice-president of systems of Security Life of Denver. "Our knowledge workers need more tools to do what they do better. They need more think time, more free time to analyze data. We're in the process of forming a long-term strategy to provide the right tools for our people."

Finding the right tool is perhaps the most perplexing aspect of a corporation's search for a professional workstation. As the IDC report indicated, it is an issue not easily resolved.

"What makes designing and implementing these tools so much more difficult than designing and implementing data processing systems is the large number of people affected," the report stated. "Traditional data processing affects only a relatively small number of expert users — but providing on-line access for computer novices to corporate files, electronic mail, business graphics and other management support functions affects the entire organization from top to bottom. It changes the way information needs to be stored, accessed, analyzed and communicated."

"The difference between [current executive workstations] and their predecessors now in use is the attention given to the user interface — the critical element in a good management workstation."

Current and proposed applications range from customer tracking to illustrated reports and from calendaring to data base management, but the single most sought after application for the executive workstation, according to the OA survey, is spreadsheet analysis. Nearly every company surveyed felt that executives needed access to spreadsheet analysis in a quick and efficient manner.

Other major areas of concern uncovered in the survey include electronic mail, WP and graphics capabilities.

Although they have been variously referred to as professional, management or executive workstations, it is not clear, according to the OA survey, just who will most effectively use the equipment. While many of the organizations queried responded that the equipment would transcend "all levels," it remains uncommon to find workstations on the desks of top executives. Technology-shy executives either refuse to find a spot in their offices for workstations or the "executive" workstation is still being operated by support staff.

"Top-level executives are really not the issue," stated Hannagan. "They are well taken care of by support people. If the executive is using a workstation, it's either because he has a hobbyist attitude toward it or he is taking a leadership role and trying to set an example. Frankly, with broad-based support, there is no need, other than for communications purposes, for the top executives to have these systems."

"We have no centralized data processing department, so there are systems in various departments of the company," said Jack Walsh, computer services manager of the Cornell Ironworks in Mountaintop, Pa. "The end users are mostly technically oriented. No executives are using them and I don't know if they will."

When asked whether there was any advantage to a personal computer over the professional workstation, the respondents were equally divided and often equally confused. User-friendliness is considered the primary asset for the workstation, and price and compatibility with the current system appeared to be the major fears.

"The only advantage I can see for a personal computer over a workstation is price, and I'm not sure that even holds up," Ray Howell, director of advanced office systems for the Hartford Insurance Group, pointed out. "There is not much difference otherwise."

"I'm not sure where the line is drawn between them," agreed

Ron Goldfarb, manager of OA systems for Pratt & Whitney Aircraft of East Hartford, Conn. "Is the Lisa just a sexy personal computer or is it a professional workstation?"

Hannagan, however, said he feels the movement toward the personal computer has allowed users, who have initially installed systems for individual functions, to discover the branch-out potential of their equipment. Professional workstations will therefore grow slowly from the personal computer environment rather than through installation of Lisas or Stars.

According to the IDC report, the influx of systems to be identified as workstations has only just begun, and expectations abound that all the major manufacturers in the industry will eventually produce terminals aimed at management.

"The difference between these products and their predecessors now in use is the attention given to the user interface — the critical element in a good management workstation. It is not really a question of developing new hardware or circuitry, but one of developing better, easier-to-use software," the report stated.

In companies where the professional workstation has found a niche, management acceptance has been uniformly positive.

"There has been no resistance whatever," Chase Manhattan's Anderson indicated. "People on the management level recognize it as a tool, as another way of supporting people's work."

"People in the financial areas are very expense conscious," said Howell. "They want to know what is being spent and what you will get for it. But there has been no resistance from a technological point of view. On the contrary, executives here are pressuring us to move forward."

Companies considering the move toward workstations are, for the most part, proceeding cautiously.

"We want our system to evolve slowly, on a low-key basis, rather than in one mass surge," said the director of business systems for a major insurance company in the Northeast. "We'll take it on an application-by-application basis and let it grow. Besides, if you ask for a million dollars for office automation, you won't get anything. By bringing it in slowly, you can cost-justify it more easily."

Virtually every organization responding to the OA survey agreed that cost-justification has been or would be a must when looking to any new technology. Many companies set up carefully monitored surveys when they first turned toward computer technology and use those as guidelines for determining the cost benefits for any new foray into the technical marketplace.

"We'll have to show a return on our investment," explained Hatch, of Security Life of Denver. "But that may not be totally black and white. The value to personal productivity, especially on the senior executive level, may not be readily apparent. But in the long run, it will become obvious."

"In companies where the professional workstation has found a niche, management acceptance has been uniformly positive."

"We did a pilot survey when we first purchased six personal computers," Goldfarb said. "We carefully measured the benefits — the time and money saved over a four-month period — and there were spectacular results. We'll do a similar pilot when we install professional workstations and then we can refer to that for any future questions of cost-jusitification."

"We feel that it is still not cost-effective to go that route," stated Michael Fedele, assistant director of the corporate data center for Duracell, Inc. of Bethel, Conn. "The cost of providing this information has to come down to make it cost-justifiable. When the costs do come down, it will be like a telephone on a desk. Everyone will have one."

As with any new product, the professional workstation must stand the test of time to demonstrate its true value. For those who have established workstations, the early returns have been overwhelmingly successful. Those responding to the OA survey agreed that once installed "you couldn't take a single one away."

"It's been tremendously successful," said Howell. "If the economy were better, we'd be running faster than we are now." OA

Rifkin is a staff writer for Computerworld OA.

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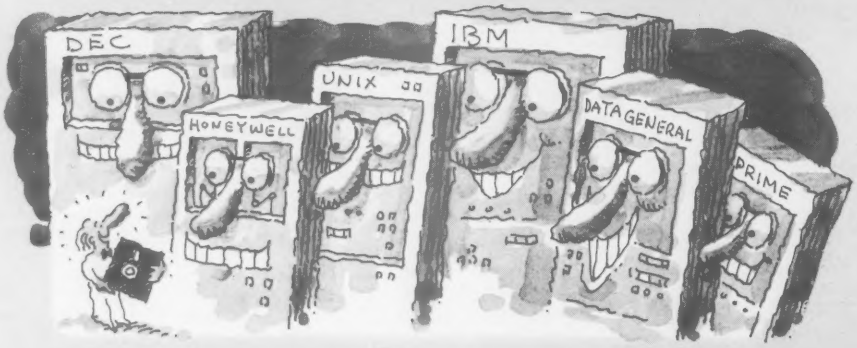

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Examining The Evidence

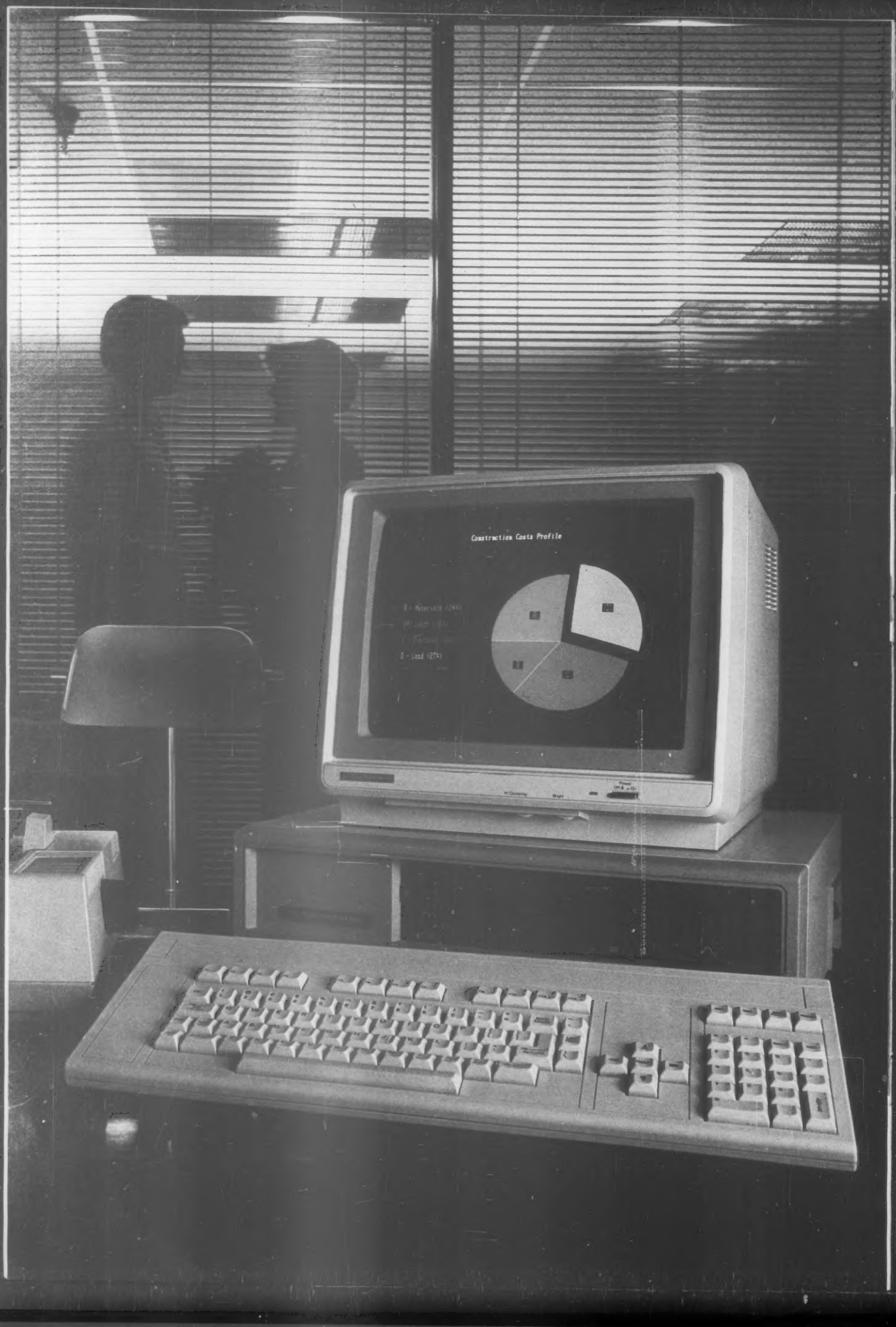
Users want a desktop computer, but whether it will be a workstation or personal computer is not clear.

By Linda Maldonado

In one form or another, the electronic workstation will become a standard office fixture very soon. Industry estimates put proliferation of these devices at 40 million units in 1986, combining personal computers with multifunction workstations. As far as the average office worker is concerned, this may well represent the first widespread breakthrough in basic office tools since the ballpoint pen was invented in 1888.

The electronic workstation — also known as the multifunction/executive workstation or activity station — puts the user at the logical center of information resources. Within inches from any point on the keyboard, the user can perform a host of functions relating to the creation, manipulation, communication, transformation, storage and retrieval of information.

What can the electronic workstation do for the professional knowledge worker? Most current models offer most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of the following generic features:

- Keeping a calendar.
- Maintaining a clock.
- Accessing electronic mail through a built-in modem.
- Handling word processing and document editing.
- Electronically filing the documents created on and transmitted to the workstation.
- Storing and running programs created or input by the user.
- Performing calculations using a built-in keypad.
- Performing at least simple graphics.
- Accessing other computers and value-added networks.
- Creating and storing forms.
- Storing phone directories, client lists and boilerplate language for letters, proposals and reports.
- Searching for on-line (and sometimes even off-line) documents through a keyword query.
- Storing and transmitting to other workstations documents created on the device.
- Responding to a user's confusion or lack of information with on-line help (embedded instructions) that describes how to activate the various capabilities of the tool.
- Allowing the user to "wastebasket" nonessential documents, which can be retrieved prior to electronic "shredding."
- Interrupting the work in progress, saving it in a buffer and allowing the user to proceed with some other activity until the work can be resumed.
- Using popular operating systems (especially Digital Research, Inc.'s CP/M) and software for special applications.

Each new vendor offering of the electronic workstation manages to package even more features and capabilities than were found on prior versions. This can be attributed partly to the growing sophistication of the nontechnical target user, who is developing a keener sense of what works and what is desirable for the personal workstation.

Electronic workstations provide capabilities for the three principal stages of information use — input, processing and output. For those whose typing skills are already well honed, creating documents — reports, memos, proposals or letters — is no longer a laborious, interrupted process.

Control over the text creation, revision and output capabilities can lead to quicker production of better written documents. Being able to move paragraphs and blocks of text from one location to another is a tremendous aid in proper organization of document sections. Documents can also be received through the modem from other workstations or computers, stored for later reference and retrieved for action.

The multifunction workstation introduces new flexibility in processing information. Text, data and simple graphics can be developed, previewed, manipulated, arranged, stored and communicated without leaving the device. Electronic spreadsheet conclusions and excerpts can be incorporated into text documents and printed out as an integrated product. And, because so much information can be accessed from a single spot, the professional wastes less time in up-and-down trips to retrieve paper files, to put and take documents or to hunt for reference materials.

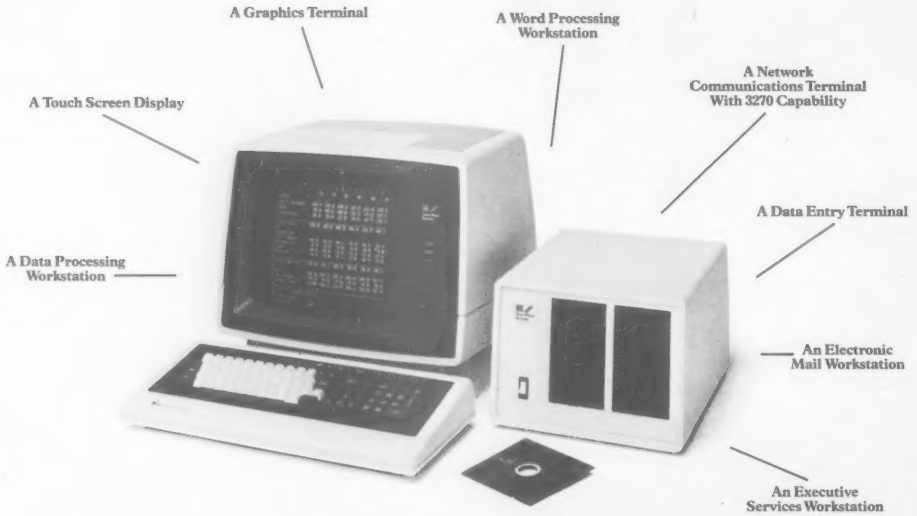
"More sophisticated workstations can be attributed partly to the growing sophistication of the nontechnical target user."

On the output side, the user has options for hard-copy printout, electronic filing or electronic transmission of finished products to other computer systems.

Many of these points apply to microcomputers as well. The ways in which electronic workstations differ from personal computers or microcomputers lie more in name and structure than in purpose or function. They are far more alike than different. Microcomputers can be equipped with peripherals and software that perform most of the functions that may be integrated into the electronic workstation. The microcomputer user may have to insert a diskette into the drive in order to conduct word processing or spreadsheet calculations, but the functions performed are essentially the same:

- The workstation is likely to have a more elaborate keyboard with special-purpose keys — FILE, GET, BASIC, MACRO and LINK, for instance — while the microcomputer user will have to use the CTRL key plus one or two other keys.
- The workstation will probably have a central controller located some feet away and several termi-

Announcing the personal computer that's also: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nals cabled to it. Hard disks in the controller will hold the software for operations and store electronically filed information.

• Electronic workstations are frequently designed with full-page video screens, often adjustable to both horizontal and vertical positions. Most microcomputers possess partial-page displays with no screen flexibility, although the number of columns can be set to allow text to exist beyond the edge of the screen. Users can then scroll left or right to see the information.

• The electronic workstations currently cost more than microcomputers — a two-terminal configuration usually runs between $15,000 and $30,000.

Given the hefty price tags for these tools — especially when an organization is planning for widespread distribution among its staff — how can prospective buyers derive the greatest benefits from their investments?

One of the most seductive arguments for purchasing OA systems is that they will increase productivity. Without offering specific details, brochures and sales pitches make liberal reference to "improved productivity." No matter how well the vendors know their hardware and software, they rarely have the need or opportunity to explore the range of activities for which workstations can be used.

Learning what can be accomplished with any of these tools is a function of time, familiarity with basic tool capacities and the imagination to examine current work practices and see how new methods can be devised using the electronic tool.

However, no matter how advanced the technology grows, we are not likely anytime soon to see keys for the following: use creativity, integrate, decide and problem solve. These activities require the integrative, intuitive capabilities of the human mind.

The capabilities offered by electronic workstations fall into the category of linear thinking — processes that can be plotted out step by step with a specific sequence. We will still depend upon the knowledge worker's brain to complete the other half of the task — the synthesis of information to develop conclusions and decisions.

Vendors promote the following as one advantage of the electronic workstation: repetitive, tedious tasks will be handed off to the technology, thereby freeing the professional's time and mental resources for more creative work. Organizations would be well served by planning activities that take advantage not only of the enhanced processing offered by the workstations, but also of the creativity of the employee who understands the work methods better than anyone else.

Office automation is one of several productivity improvement tools that have been tested by organizations seeking to improve performance. Other techniques include quality circles and team-building techniques, work redesign programs, profit sharing and environmental upgrading.

In 1982, the American Productivity Center (APC) and Steelcase, Inc. released the results of a study they conducted. It contains the following statement by C. Jackson Grayson, chairman of APC: "If procedures used by the companies in our study were universally applied, more than $95 billion could be saved annually." Comparing the pay-back periods for different approaches, the study found that quality circles and team-building techniques appeared to show returns in about six months. Automated office systems showed a pay back in about one year and environmental design changed in one-and-one-half to two years.

Although this study and others have determined that productivity improvement programs do show results, most organizations have shown no strong trend to design and implement performance improvement programs. An opportunity for realizing even greater returns than previously reported may lie in an approach that integrates all three aspects — human resources, automated tools and environmental design.

As tools for knowledge workers offer more complex functions, purchasing organizations should attempt to ensure that optimal use is made of these tools. One method to accomplish this is by encouraging regular opportunities for users to meet and share ideas, problems and innovative applications. There will always be a few people who dream up brilliant and off-beat uses for a tool; others will have difficulty using more than the simplest features. The opportunity to share individual experiences can ensure that the imaginative uses are publicized and transferred throughout the circle of users and can also provide resources for those experiencing difficulty. Organizations phasing in automated tools over

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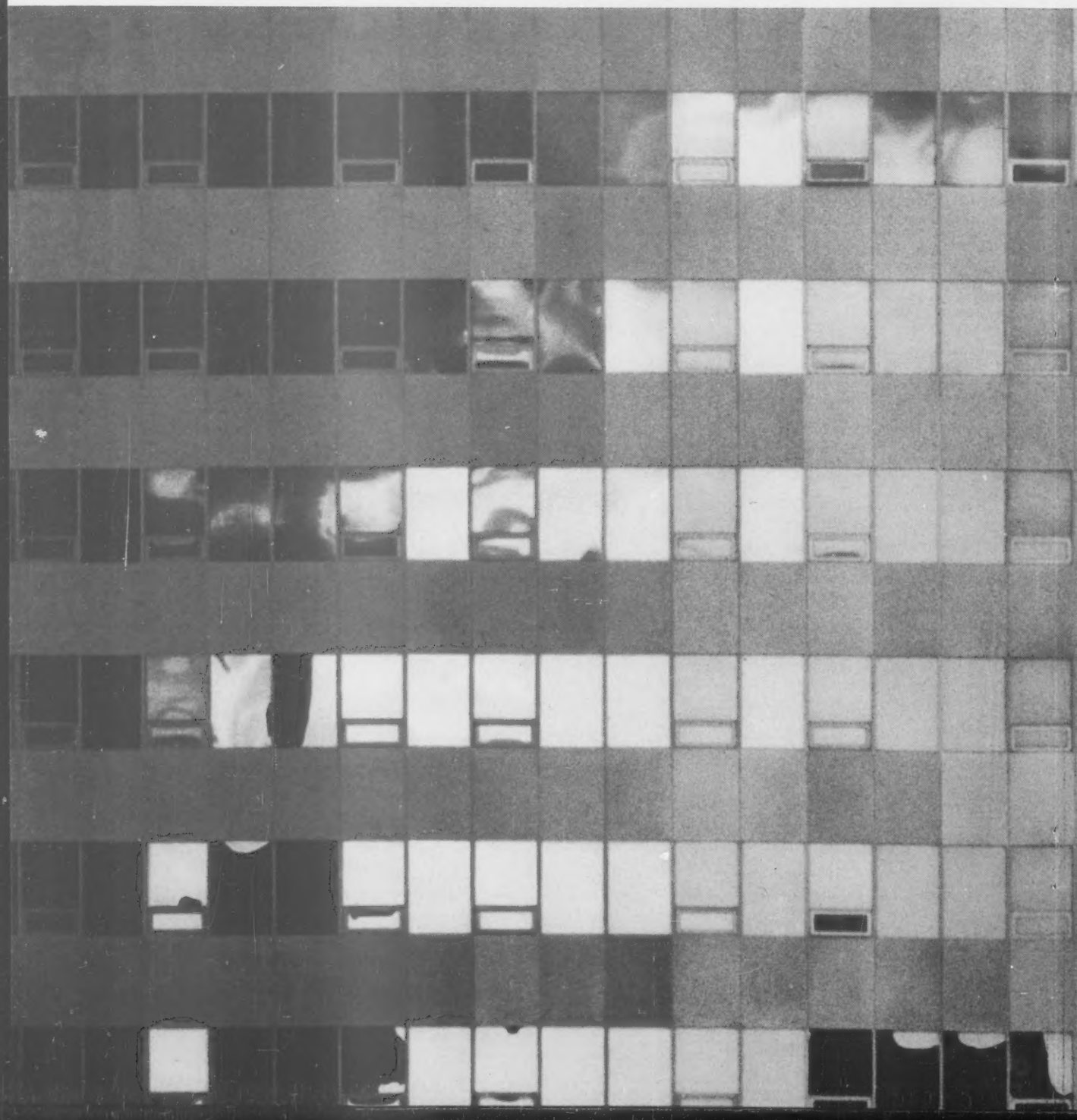

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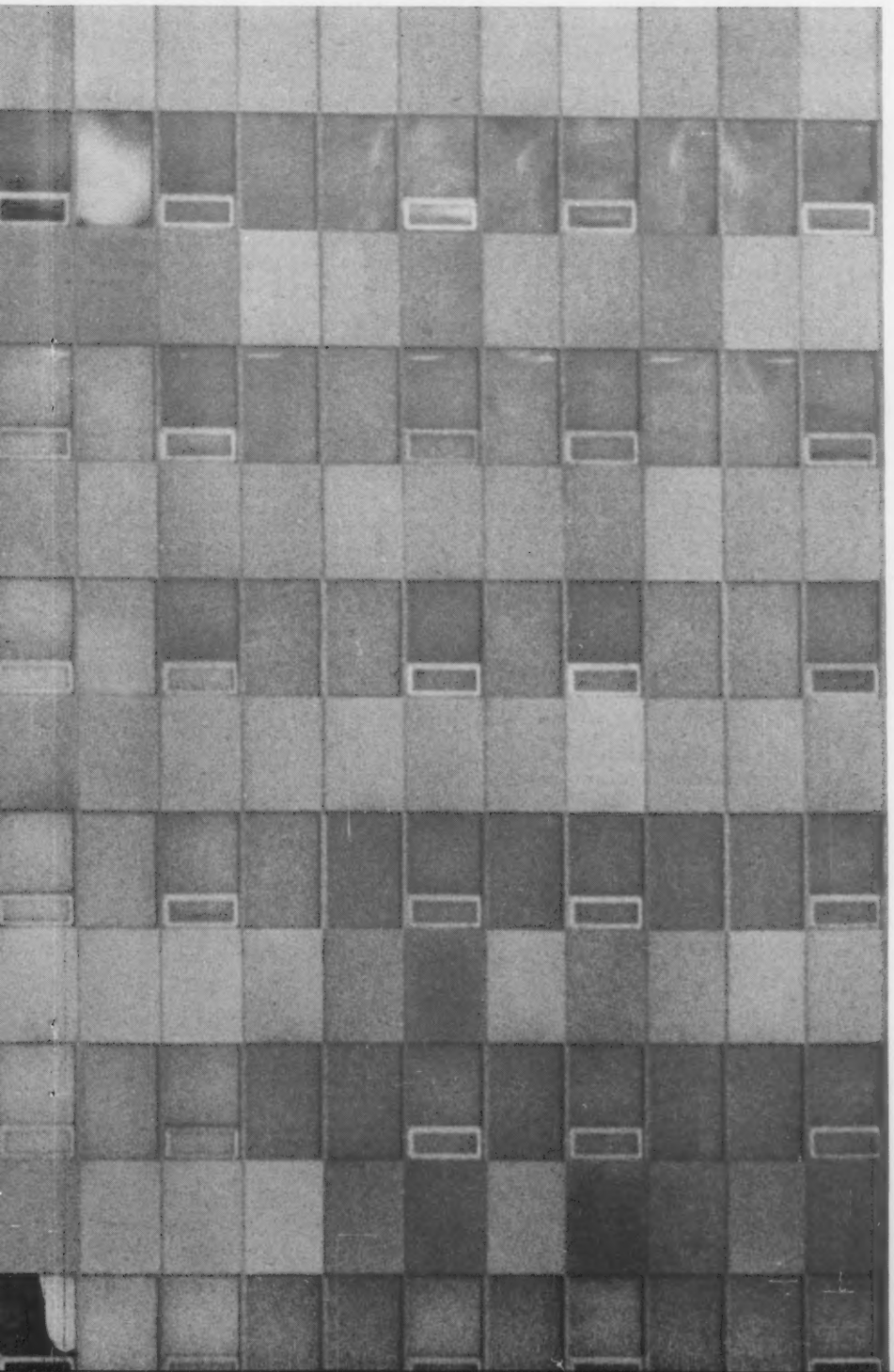

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time may find that providing visible and valuable support for users can be a big step toward establishing a climate of acceptance among the rest of the prospective users.

Vendors cannot anticipate every type of task and function engaged in by an organization's staff. Organizations should therefore be sure to provide support for the users of electronic workstations seeking out improvements in the work methods that can be performed by the new tools. This is particularly true for activities related to organizational priorities or those that contribute generally to more efficient and effective performance of priority activities.

An example of this kind of activity is the development of specially formatted budget spreadsheets that permit analyses which, because of a lack of time, were not undertaken before the introduction of electronic workstations. Another might be the creation of special "macros" that automatically activate a sequence of keystrokes for bringing up a form, entering information, adding it to an existing file and transmitting it to a main computer — all of which might previously have been done manually, but at a greater cost in staff time. Encouraging activities like these could even lead to procedural and work flow improvements not directly linked to the new technology.

An interesting trend among designers of electronic tools for nontechnical users is to test the design model with people who are representative of the target user. One outcome of this research has been a huge reduction in the time required for a layperson to acquire a working knowledge of the system's operations. Apple Computer, Inc. has estimated that the nontechnical user can become comfortable with the new Lisa personal computer in about 15 minutes, compared with 20 hours required for comfort with the Apple II computer.

Another result of such testing has led to greater use of the mouse artifact for controlling screen commands, as well as greater integration of graphics in basic workstation operations. The effective use of the mouse brings up an important point: Historically, users have initially resisted using the device. However, according to James N. Bair of Bell Northern Research, the performance improvement in activities such as editing and other interactive screen tasks using the mouse is so substantial that "it appears worth any effort to add the mouse to present workstations or obtain a license."

The users were unable to foresee that use of the mouse would produce a performance improvement. Only experience and patience yielded the improvement in a measurable fashion. This suggests that exploring the combined resources of employees and electronic tools with electronic workstations could result in unexpected gains in both efficiency and effectiveness.

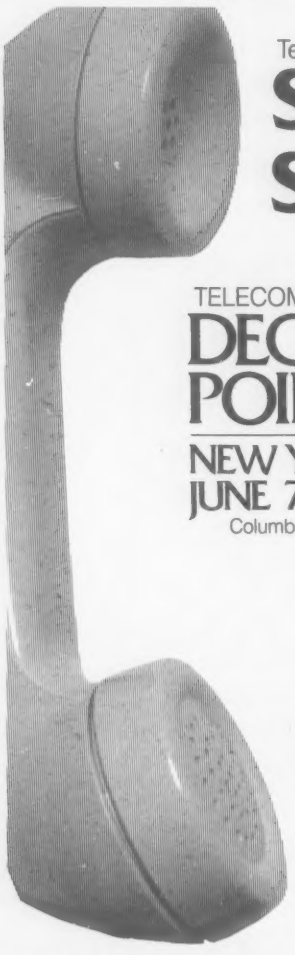
One technique for generating new ideas for performance improvement through the application of electronic tools is scenario building, which has long been a staple of strategic planners. Scenarios can be used to project how an organization might transform its work methods and enhance its performance through extrapolation of known and anticipated human and technological resources. Experienced users of electronic workstations could jointly create a number of scenarios to stimulate ideas for optimal use of the technology.

Difficult economic times seem to limit our vision and perspective. The pressures on managers to reduce costs are enormous. Because the cost of people constitutes about 90% of the cost of running an office, there is a strong inclination to replace people with less costly technology. It is easy to lose sight of the performance enhancements employees can contribute if management climate is supportive.

William F. Rosenberger, of Wang Laboratories, Inc., wrote in a 1982 article, "Perhaps the more significant perceptual change resulting from the installation of a local network will be the understanding that shareable information is only surpassed in value by an organization's people." OA

"An interesting trend among designers of electronic tools for nontechnical users is to test the design with people representative of the target user."

Maldonado is an office systems analyst at Genasys Corp, a research and consulting company in Rockville, Md.



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The WP Solution

WP equipment has been around awhile, but changes are still ahead.

By Mark Hayward and Walter Ulrich

Word processing is more essential to the emergence of office automation than many people realize. The early commercial applications of WP were cost-effective only for repetitive letters and for documents that needed minor revisions. The equipment was difficult to operate and was placed in WP centers, out of the office environment and away from the users they served.

In the 1970s, these so-called "power typewriters" gave way to the first display WP terminals. Shared systems were also developed and allowed users to add WP terminals without purchasing additional printers, disk storage, memory and so on. Today, shared systems are almost always more cost-effective than stand-alones will probably dominate the WP marketplace by the end of this decade.

Today's word processors offer mathematics packages, spelling dictionaries, list processings, the ability to do simple programming and more. In some cases, multiple fonts

and graphics can be prepared and viewed on the screen as they will appear on paper. Some of these new features provide real productivity improvements; others are little more than bells and whistles.

The functional enhancements at each workstation are fantastic. Nevertheless, ability to use communications is more important to understanding WP's future role in OA. A very practical communications use is the ability of one user to help another while each stays at his own desk. For example, a user on one floor of your company may be unsure of how to proceed with revisions on a certain document. That user can phone another more experienced user. While each displays the document on his screen, they can help each other review the necessary procedures for completing the work.

Local and remote document distribution is another advantage of communicating word processors. Document distribution decreases costly delays in interoffice mail. In many cases, users are sending and receiving documents across the country in the same time it would take to deliver them across the room.

"Communicating WP has one major pitfall: One vendor's product is rarely compatible with other vendors' products."

Communicating WP has one major pitfall, however. One vendor's product is rarely compatible with other vendors' products. Having the same communications protocols means nothing. Each word processor uses different formatting commands to achieve the same printed results. Compounding the problem, even different word processors marketed by the same manufacturer are sometimes incompatible. Correcting this oversight will be difficult for vendors and costly for users.

This compatibility problem may be changing. In February, Data General Corp. announced its word processors will accept documents from Wang Laboratories, Inc. word processors and convert Wang's internal format to its own. It remains to be seen whether this is an isolated incident or whether it portends a shift toward standardization. Other vendors are working on black boxes that will perform conversions between unlike word processors.

For some vendors, WP will tie in with DP and office services. The word processor is a specialized workstation integrated with the overall computer and office system network.

Communications was unavailable on early word processors. Later, communications was added as an option. We estimate that only 30% of the currently installed base of word processors can communicate, and only a third of that 30% communicates effectively. However, by 1985 all word processors being shipped should have the ability to communicate. What was once an expensive option will become standard equipment.

WP usage is changing. One of the most obvious changes is its movement out of the center and into user departments. Users are also becoming more sophisticated. They are selecting their word processors more intelligently and planning their deployment with greater care.

When WP began, the equipment was expensive and human resources inexpensive by comparison. Like computers, WP equipment was consolidated into a center. Typing was brought to the center and effective center management required the equipment to be in continuous use.

Since the equipment was more expensive than the people, the people were inconvenienced in favor of equipment efficiency. Long turnaround times were common. In addition, because of the physical separation involved, the operator might not really understand what the author intended. The usage may have been efficient, but the service was typically lousy.

Today, people are the expensive resources. Word processors have become much less expensive, and they should not necessarily be scheduled in the old ways. Many more word processors make economic sense than they did a decade ago, and these new word processors are going out into departments, directly on users' desks.

The dollar benefits of WP are dramatic. One organization had 138 word processors installed in a decentralized environment. An evaluation of the effectiveness of these units showed that for every dollar of equipment cost, two dol-

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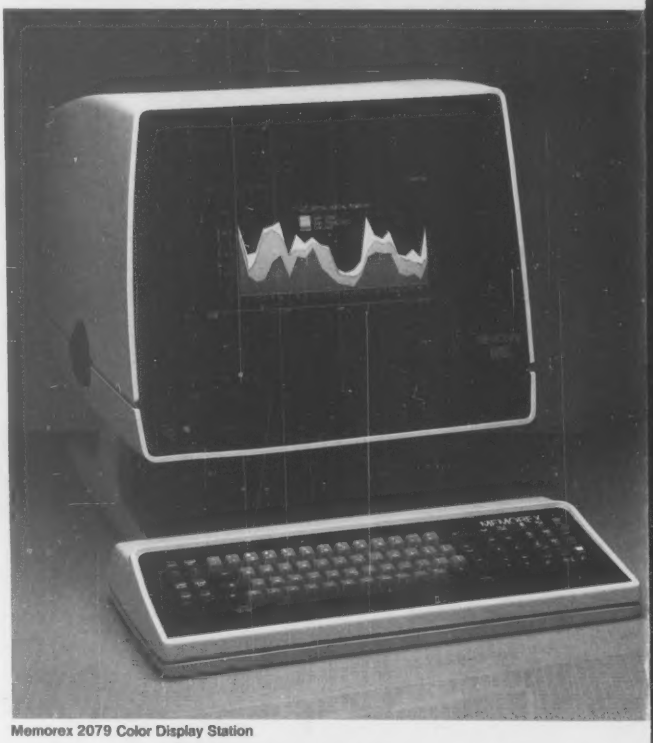

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lars of directly identifiable salary savings were made. It is not uncommon to find a 2:1, 3:1 or 4:1 savings when WP is installed in the right places and implemented properly.

Today's users are more selective than ever before. Rather than purchase equipment on an ad hoc basis, they study the company's overall requirements. They then select products that best meet all their needs. No WP product is like any other, and those sometimes-subtle differences can play a big part in how productive the equipment is in any particular environment.

Forward-looking users see that WP fits into their overall office system framework. These users are developing OA plans that include WP, electronic mail, personal computing, executive aids, scheduling, data access, graphics and, sometimes, voice communications services. This is an important trend and ensures the longevity of the investment in office products.

Selecting the right system is only half the battle, however. Using it right is the other half. Solid training is essential. Too often, users are trained inadequately, and the people they support are not trained at all. If no one understands what the system can do, real WP benefits will never surface.

One avenue toward ensuring good training is to maintain a qualified in-house staff. Although not sensible for small companies, in-house experts are crucial for large installations. Yesterday's WP center supervisor is today's distributed WP system administrator. This person is responsible for such things as developing applications, writing procedures and ongoing hand holding.

What about your company's WP center? It should still be used for work that is not time-sensitive, like lengthy manuals and mass mailings. However, the corporate WP center will also become the school for company employees. Seminars and other types of training will allow secretaries and principals to grasp the concepts more quickly and see how they apply to their jobs.

Word processing reduces clerical labor time and drudgery. It speeds document preparation and allows for improved document quality. Authors' proofreading time is reduced.

Word processing also improves quality and saves money. It can be quantified, and solid economic justification can be prepared where it is appropriate. WP is the first element of OA and an accepted part of today's office environment.

Perhaps WP's key contribution is that it has paved the way for other workstations. We have become accustomed to seeing a "computer" on the secretary's desk. That has to have an impact on educating the business public that desktop computing is practical. Now, if we can only overcome the stigma attached to an executive's using a keyboard . . . and today's colleges may be taking care of that.

"Fortunately, computerization offers an opportunity to tailor workstations to the needs of an individual."

Several people have said word processors will give way to personal computers. That is a very strange notion indeed. We are not exactly sure how to define "personal computer," but the idea that we will all have the same thing on our desks is patently absurd.

Word processors have been computer-based for more than a decade. Many already run or claim to run the Digital Research, Inc. CP/M operating system. However, word processors that run personal computing are not well suited for executives and professionals. Conversely, most personal computers have WP software, but none of them are very good in the secretarial environment.

Word processors should not be seen as computerized typing machines, but as workstations for secretaries and other office personnel who process large amounts of data. These workstations should be optimized to perform these kinds of functions. In today's office, that means the keyboard, cursor control, screen and software must be designed to meet these needs. For users who prepare documents, these specifications are very different from those of other office workers.

In general, no one kind of workstation is suitable for all office

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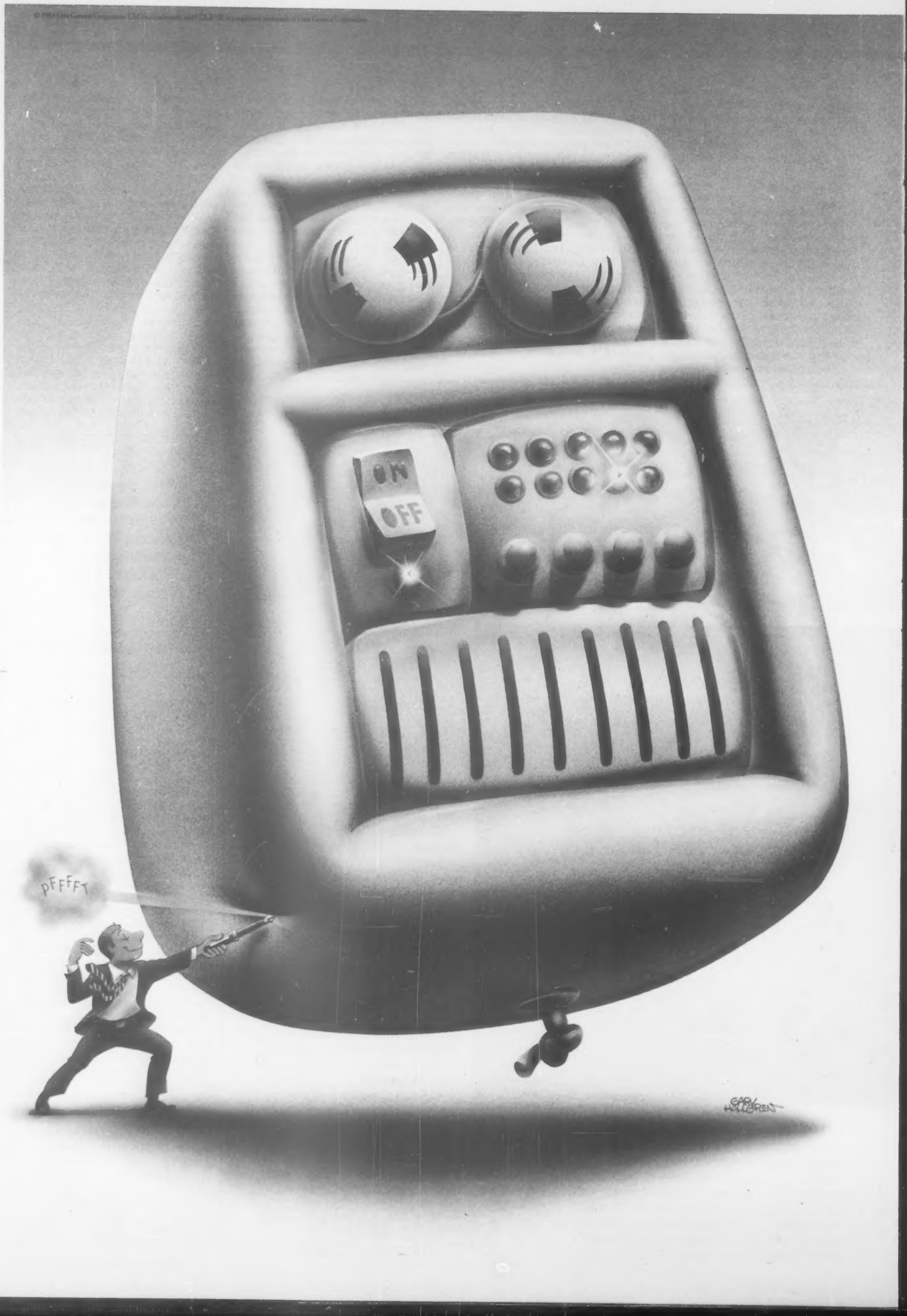
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workers. Fortunately, computerization offers an opportunity to tailor workstations to the needs of the individual. The workstation ("word processor") for the secretary who types will differ from the workstation for the administrative assistant who does little typing. And among professionals, a wide range of different workstations will reflect the variety of tasks different people do. Planned and implemented properly, these units will all tie together.

In conclusion, word processing is an important and effective technology by itself. It improves secretarial and professional productivity and speeds document preparation.

Secretarial workstations will continue to be tailored to the needs of secretaries, and word processors will continue to be specialized. They will be designed to enhance document preparation, distribution, filing and retrieval.

Secretaries and clerical employees are central to the effective operation of any business. To do their job properly, they need the proper tools. That will not change tomorrow or in the foreseeable future.

As word processors become more powerful and less expensive, they will flourish throughout the office. Users are being more careful to make the right selection. The ideal situation is where WP plans are developed as an integral part of the overall corporate technology plan. OA

Hayward is a senior analyst with Walter E. Ulrich Consulting. He specializes in word processing and has consulted with user companies and vendors.

Ulrich is president of Walter E. Ulrich Consulting, a Houston-based firm specializing in computers, communications and office systems.

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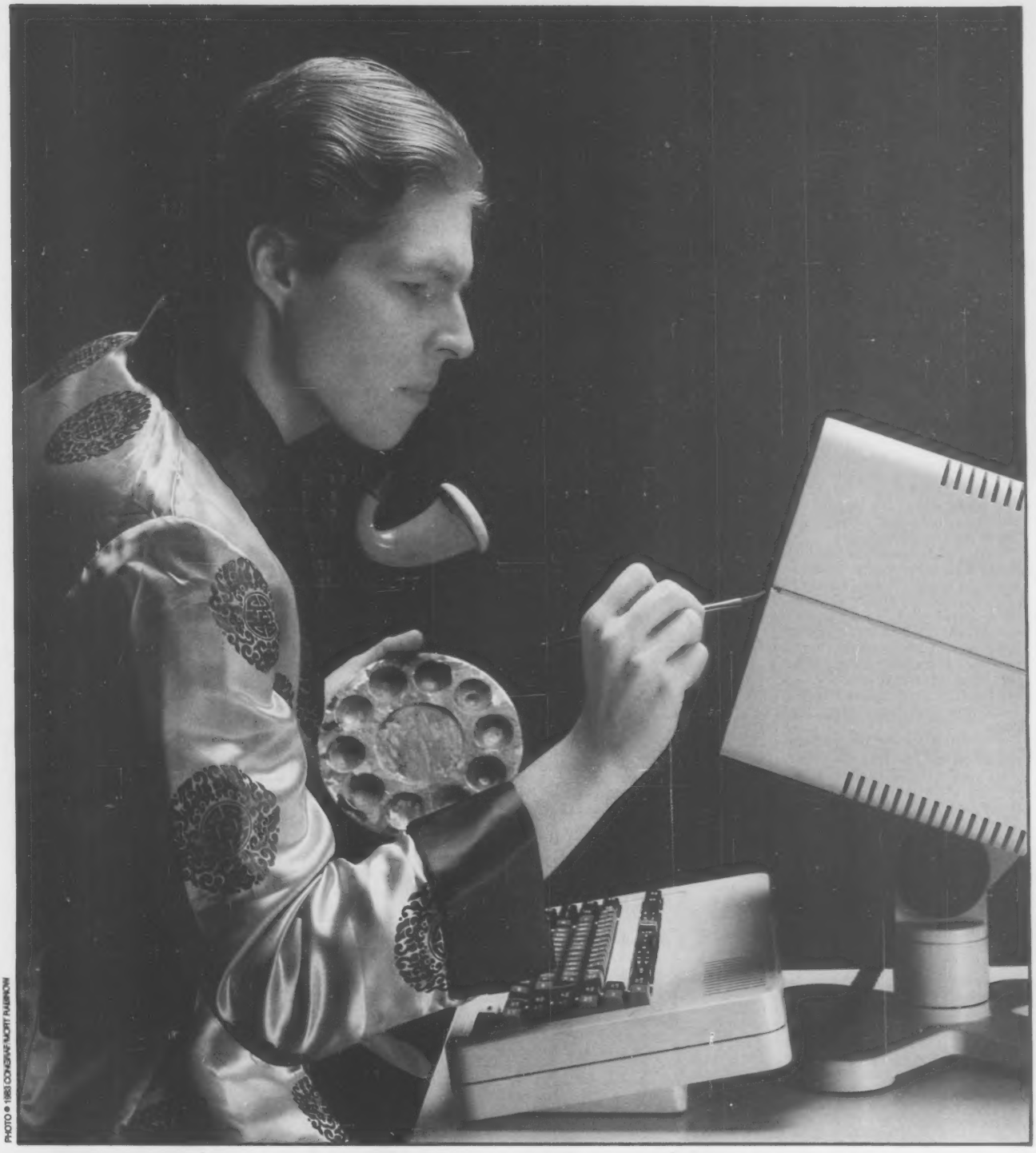

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The Color Caper

Although the totally multifunction terminal has not yet arrived, things are changing, especially in graphics.

By Robert Varga

Management of information — its creation, collection, processing, storage, retrieval and dissemination — has always been the business of the office. During the past 20 years, however, digital computers, printers, copiers, text processors and the national communications network have dramatically improved the means for managing business information.

Until the last several years, these various office devices and their respective technologies have coexisted almost as isolated solutions within the same markets. Implementation of specific designs was largely a matter of matching technology to applications. The resulting machines, internally and externally, were as varied as the applications themselves.

This situation is now changing at a spectacular rate. Throughout this decade and into the next, the brunt of information management functions will increasingly be

handled by fewer types of internally distinct equipment.

What we are moving toward is a type of unit engine — a multifunction workstation to perform the "soft" functions of information management, such as image, text and voice processing or transmission.

In addition, a major development is under way toward total integration of the workstation with devices such as spot scanners, intelligent copiers and facsimile devices that perform "hard" functions. As these workstations evolve, new system functions and capabilities are coming to the forefront and one of the most prevalent of these is color display graphics. A better understanding of these future directions for office workstations can be gained if we examine briefly the major forces driving the industry.

Office automation is synonomous with information management; it supports the business objectives of the office. All business activities have a common thread in their need to manage information. This common thread becomes more significant if all business information is seen as falling into five distinct types: data, text, graphics, image and voice.

The variation and relative emphasis on the functions of collection, creation, processing, storage, retrieval and delivery of these five types of information differentiates industry boundaries, market segments and product offerings in OA. Word processing systems, for example, deal in text; a command and control system may require all five information types.

Digital technology has made two distinct contributions to workstation design. The first is the common representation of information — the bit. The second contribution is composed of advances in very large scale integration (VLSI) technology, which have resulted in common circuitry to receive, process and deliver information — for example, random-access memory chips and microprocessors.

At the product planning level, this can have a profound impact. Micro circuit chips can be combined to produce building blocks for generic information management functions and for generic operations on the five basic types of digital information — independent of a specific market application. In fact, a major chip manufacturer has recently announced chips that merge text and graphics.

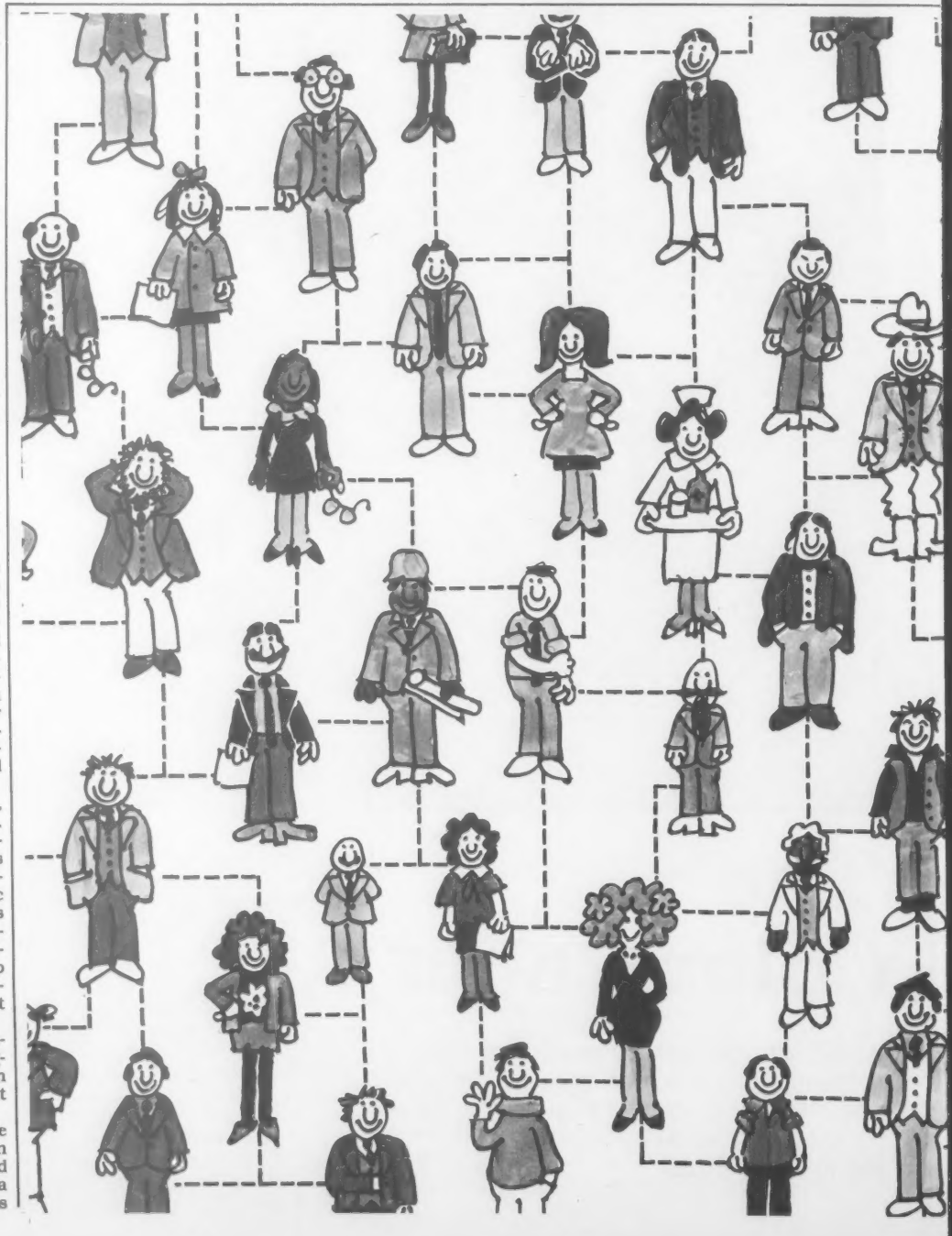
Systems and applications software, peripheral devices, packaging or even special circuits can then be used to shape a product for a particular market.

This confluence of knowledge and technology has been going on for several years. It has spawned the multifunction workstation, a digital machine which cuts across industry, market and product boundaries. Through this decade it will prove to be more than today's marketing buzzword.

"As these workstations evolve, new system functions and capabilities are coming to the forefront, and one of the most prevalent of these is color display graphics."

The personal computer is another major influence on future workstation architecture. The impact is not only at a technological level, but also at a corporate policy level. The personal computer is being introduced into businesses at a spectacular rate. Industry estimates are that IBM and Apple Computer, Inc. alone account for more than 100,000 units per month, and about 50% to 60% of them are used in business.

Although excellent software tools and prices have encouraged the personal computer's acceptance, they are not the only reasons behind its emergence. In addition, the need to have autonomy over what is computed and the desire to control processed information have been important contributors.



When the first digital computers were installed, prices were in the tens of millions of dollars. As a consequence, these machines had to be justified as a shared corporate resource. Moreover, dedicated personnel had to be assigned to support and to offer corporatewide services. In this way, departmental groups and individuals began to have their computational needs serviced by a centralized DP department.

It wasn't long before DP departments developed user software based on corporate policy. This often meant that in order to do quick and dirty computer studies, you had to write your own software.

The personal computer's acceptance in business represents a de facto policy shift that permits individuals and departments to fulfill their own needs. The personal computer represents a corporate endorsement for moving whole applications away from the central computer as it becomes a host vehicle for high-performance intelligent graphics, imaging and hard-copy devices. This can be viewed as a revolution in which the central computing authority is shifting to local autonomy, and computing assets are being distributed to individuals.

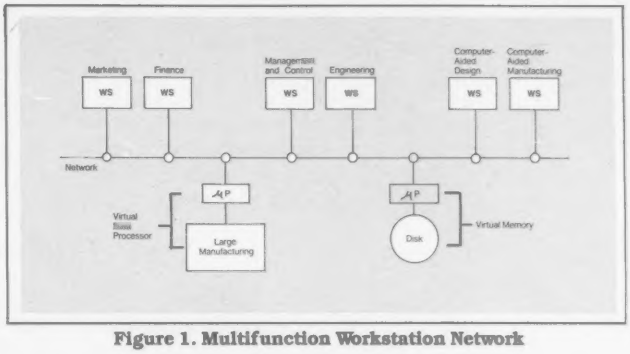


Figure 1. Multifunction Workstation Network

Two remaining factors are shaping the workstation architecture and configuration for the '80s. One is the need to establish and maintain a corporatewide data base system. The other is the need to communicate from a workstation to this data base and to other workstations.

The systems architecture that results is a direct consequence of these considerations (see Figure 1). Figure 1 illustrates a network of distributed workstations with access to a mainframe computer, which acts as a virtual data base processor and a large capacity disk for virtual memory. Functional and applications intelligence is shifted away from the mainframe computer. The workstations reside in geographically dispersed departments and are equipped with software tools and intelligent peripherals to support the local information management needs of each department.

These and other events have led to the demand for color display systems in information management. The requirements for workstation displays vary considerably with each application. They can include anything from a simple alphanumeric terminal for word processing to an advanced raster-scan display system for graphics or imaging.

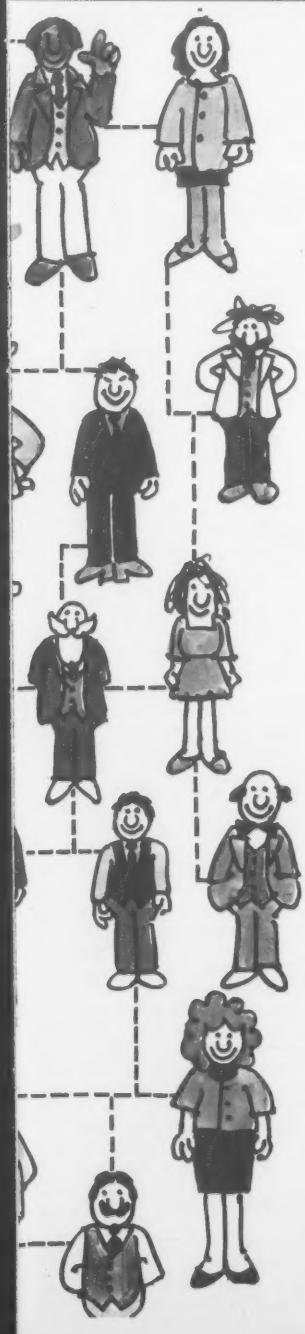
In its simplest form, a display is a window for viewing resident electronic information. Through this window, information is reviewed, processed and modified — in short, repackaged.

A raster-scan, bit-mapped, color display system can be a powerful addition to an information management system. Not only can it display information, it can also be used as a kind of electronic scratch pad. Without destroying the original, it can further manipulate the information to reveal previously unseen results or to enhance the display appearance.

In more advanced display systems, general-purpose software on the host can be traded off for dedicated hardware or firmware in the display terminal. Performance goes up; so does the display price.

In general, one should think of a color display system as a special-purpose computer for efficiently displaying text, graphics or image information. It performs these tasks better than a general-purpose computer with a dumb color terminal, and reduces the computational load from the host machine with which it communicates. In this sense, a color display system directly supports information management functions.

The number of colors that can



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be viewed on a color display system is practically limitless. Systems today offer from as few as eight to as many as 16 million different colors.

Display resolution is another issue. Nominal screen resolution breakpoints, given in terms of the number of individual horizontal and vertical picture elements (pixels) appear as follows, where H represents horizontal and V represents vertical:

Resolution	Pixels	
High	1,280 H by	1,024 V
Medium	640 H by	480 V
Low	320 H by	240 V

"The penetration of color systems in the market has been hampered by the lack of reliable and economic fast color printing and copying."

The limitation on higher resolution color is a result of the existing state of video display technology. Monochrome displays can go beyond 1,000 pixels — for a price. Most bit-mapped monochrome displays are 1,024 H by 768 V.

Intelligent copiers, printers and micrographics; teletex; facsimile; videotex; and networks all have the same characteristics of a soft interface to receive digital information and a transformation process to convert the digital information to a format suitable for either digital or analog media. However, they also share the same basic problems. This is largely an issue of communications standards.

Teletex and videotex are relatively new concepts. Standards have been established and interfaces with telecommunications networks exist. However, not all workstation vendors have provided the connections.

Facsimile is much older; some standards do exist and more are emerging. For example, a proposed standard for Public Domain Networks will be adopted in 1984.

Network standards are a jungle. At present, there are more than 60 local-area networks, among them several de facto standards. One saving factor is that those networks that survive will communicate with IBM and AT&T networks.

The penetration of color systems in the market has been hampered by the lack of reliable and economic fast color printing and copying. Most color copy devices have the same limitations: eight or fewer colors, two to four minutes per page and fair to good quality.

The technologies already in place include impact, dot matrix and ink jet printers and pens. Thermal printing technology is on the horizon. The quality appears very good, and print speed in some cases appears to be less than one minute. The thermal process also gives direct printing of color transparencies by substituting mylar for paper.

A lot of room for improvement still exists in both printing and copying, and no great breakthrough appears to be on the horizon. The world of information delivery is still a paper world; because of copier technology, it's a black-and-white world as well.

Workstations with color graphics must be able to deliver formats for hard copy that substitute halftones and patterns for colors. The use of color hard copy in reports will continue to be limited until print time is reduced significantly and the primary use of color hard copy will be in presentations.

Decisions to purchase or build products for OA can be aided significantly by considering the major requirement to be one of information management. The system under consideration can be evaluated according to how it handles the types of information most appropriate for the product-market fit, and how it integrates into the functions of the specific information management system.

OA

Varga is director, business graphics product marketing for Ramtek Corp., McLean, Va.

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Elementary!

The Xerox Star helped pave the way for Apple's Lisa. What lessons did Apple learn from the Star?

By Winston Bradford

Office automation vendors are competing to lead the revolution in OA. At the same time, however, a quieter evolutionary process is occurring — building on the past.

In developing new products, companies have always built on the experiences of competitors. This kind of redundant product proliferation and evolutionary process happened with Xerox Corp.'s Star and again with Apple Computer, Inc.'s Lisa.

It is interesting to stand back and note some of the transcending events and reasons that lead to eventual product introductions. In some ways, the Star and the Lisa are similar. What events led to their development in each of these companies and what do the products offer users?

A few years ago, Xerox — a successful quality-printing and photocopying vendor — decided to take on the front-runners in all areas of OA. And, although everyone talks about Xerox when discussing OA, the hard facts remain

that 74% of Xerox' revenues and 89% of its profits at that time still came from copiers. One major competitor listed the factors of Xerox's successes in a very complete and uncomplicated manner: supporting the premise that power lies in marketing. The criteria included:

• Every industry report mentioned Xerox, IBM and Wang Laboratories, Inc.

• Xerox is an $8 billion company with a substantial cash flow from a huge copier rental base.

• Xerox has shown a determination to be a leader in all its markets.

• Xerox has made a solid commitment to leadership in the automated office market.

• Xerox came from nowhere in 1980 to take second place in 1981 in stand-alone WP, largely on the strength of its marketing power.

• Xerox has most of IBM's strength, plus an additional one — flexibility.

• Xerox is in every office, with a strong reputation for highly professional marketing and customer support, and its sales force is second in size only to IBM's.

• Faced with intensified competition and a potential saturation of the copier market, Xerox needed to reduce its dependence on copiers. It had to act fast because copier profits were eroding and the rental base was being sold off.

• Xerox is going all out to buy market share in every conceivable office-related area, possibly at the expense of profits.

• Xerox isn't waiting to attack until it has all the pieces, but is willing to use the technology and products that make its systems offerings work.

• Xerox is the only company of its size in the industry to show that it can make diversification and acquisitions work.

These points have little to do with products; rather, they relate to marketing solutions to the office. Xerox' Star tried to address just that — bringing control to the newer but less sophisticated user — the professional. IBM had never looked at the professional segment, seemingly operating under the belief that a large computer manufacturer only had to have a reliable product in the right place at the right time. On the other hand, Three Rivers Computers has offered a Star-like technology for some time.

Xerox has had its setbacks over the years in both its copier and computer divisions. One recent example was the decision to scrap the Xten public network after a $30 million investment — plus the $200 million acquisition of Western Union, Inc., which was intended as an international vehicle for Xten.

The legendary Palo Alto Research Center (Parc) was given considerable capital aimed at long-term research. A remunerative quick return was not necessary so long as the Ethernet local-network concept became an industry standard. Xerox had always been highly attentive to financial planning. The tight system of financial controls had been described as bordering on the conservatively oppressive. If Xerox was willing to lose money for a while to buy market share in OA, as many had believed, it was a deliberated decision.

"The Star was the first commercial product that addressed the user-friendly but computer-ignorant professional or manager."

This was the state at Xerox several years ago when John Titsworth was hired to head up all information processing activities. A former executive vice-president of Control Data Corp., Titsworth wanted to bring some of Parc's developments to the commercial market. To fire up a new marketing strategy, Titsworth hired one of the most unlikely people ever to work at Xerox: Donald J. Massaro. Massaro, 38 years old at the time, was an aeronautical engineer who helped start Shugart Associates, Inc., the leading maker of flexible-disk memory. He had risen to the level of president by the time Xerox bought Shugart.

The immediate result of Massaro's hiring was positive. He managed a quick fix for the product line and finessed the debate about the utopian system vs. the evolutionary products by announcing two developments simultaneously: the 860, a more flexible version of the 850, and Parc's Ethernet, which 860s could use to talk with one another. The flaw, however, lay in the Star's lack of commercial success. The Star was the first commercial product that addressed the user-friendly but computer-ignorant professional or manager, a necessary final link that would tie everything together into Ethernet's local-area network.

The year after Massaro was hired, Xerox began placing its small copiers and 860 word processors in smaller accounts through dealer distribution. Xerox has expanded that program; all small products are now also sold in retail stores. The alternative channels may end up competing with the sales force in the future, but in the meantime Xerox has been gaining maximum leverage. The product development area, however, has been slow. The Star, for example, with all its bells and whistles, did not have advanced software for text editing or management functions. The need for product innovation was pressing for Xerox.

Xerox's announcement of the Star generated lots of noise, not only in the trade and business press, but in academic circles as well. The Star had not yet reached a formal trade show introduction when the results of a poll done by

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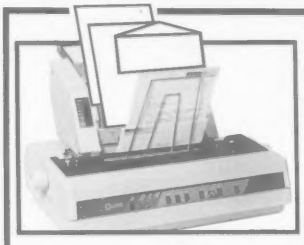

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a group of Parc market researchers came in. Replies and predictions took the form of lines of reasoning on whether the Star would win or lose, definitions of what would be considered success for a product like the Star and some caveats from industry gurus on their expectations relating to Xerox's marketing efforts.

David Liddle, the engineer behind the Ethernet concept, claimed the Star system was specifically designed for the business "professional" whose main job it was to create, interpret and manage information and then to distribute the result to others in a convenient form. Furthermore, Liddle clarified, the Star was not an executive or managerial workstation. According to his description, professionals were those workers who were individual contributors, typically earning between $2,000 and $5,000 per month; significantly interacting with their own peers at work; and generally lacking any knowledge, skills or training in the use of office equipment. Typical target professionals for Star included engineers, accountants and financial analysts.

Others disagreed, among them Amy Wohl, then-editor of "Advanced Office Concepts," who stated: "It is not clear to me that this is the terminal for professionals . . . If you're talking about the kind of person who wants to access information, then they can do a great deal without a $16,000 workstation." If, however, that person is concerned with the form that output will take, then Star was clearly the best terminal on the market, Wohl stated.

The two questions, therefore, that industry analysts and techie soothsayers had to come to grips with were the following: First, was the target professional really in need of such a computer, and second, if there was a true demand for the unit, would the cost be justifiable?

The Xerox 8000 network concept is really different from that of any other executive or professional workstation, for example Burrough Corp.'s Ofisl or Data General Corp.'s CEO. Whereas the other manufacturers promote administrative features, the Star does not. The Star was developed as an advanced workstation for the 8000 Network/Ethernet, not as a stand-alone. Similar to the claims made later on the behalf of the Apple Lisa, Xerox claimed hundreds of man hours of development work were necessary to launch this product. The Star was developed over a period of 20 years and was based on the Alto system concept.

Xerox clearly announced to the world that the Star workstation was not developed for secretarial or clerical use. First, they dubbed it the professional workstation; second, they eliminated many features necessary for effective and global administrative production.

"Xerox clearly announced to the world that the Star workstation was not developed for secretarial or clerical use. First, they dubbed it the professional workstation; second, they eliminated many features necessary for effective and global administrative production."

The concepts of global search and replace, merging, automatic paragraph numbering, edit-check, clean, or any steps required to perform any of the simple editing functions are not part of the Star. Xerox is selling the 860 for that purpose. Whereas the 820 is used as a personal computer, the 860 is used as a word processor with more specialized records processing and mathematics.

The irony comes in the justification of the Star on the premise that, because the professional is paid two to three times as much as a clerical person, he would feel it his obligation to ignore anything clerical. In reality, people tend to want the fastest control over their production, and often that means having administrative control as well.

Xerox believes that training the professional can be accomplished through self-teaching modules in the form of diskettes, which take a total of about four hours. The company supports this method of

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incremental learning through the concept of Progressive Disclosure, in which a person learns only what he needs in his particular function and environment. The premise behind this philosophy is that no user is likely to implement all the features a Star provides. For example, the keyboard-wary knowledge worker is not the same person who will create documents with a variety of graphic exhibits and typestyles.

This reasoning is fine, but the claim is a bit off if Xerox is saying keyboard-shy users are always typography-competent and vice-versa.

In the area of cost-justification, the potential Star owner cannot really be sure how the prices of workstations are derived. This happens because of various imbedded costs. At NCC '81, for example, one potential customer had the following conversation with a Xerox sales representative:

"Yes," the representative exclaimed, "the Star is only $16,300."

"That's all?" the attendee replied.

"That's right, only $16,300!"

"Great, here's my check for $16,300. Please deliver my Star to . . ."

"Well . . . uh . . . ," replied the sales representative, "You have to buy a File Server, too,"

"How much is that?" (The eyebrows went up).

"$20,000," returned the representative . . ."

But what about the Apple Lisa? Jonathan Seybold, of the "Seybold Report on Publishing Systems," compared the Star and the Lisa.

Seybold concluded that Lisa is not an expensive Star clone, but is actually more of a direct descendant of the earlier Xerox research into a visual user environment than the Star was.

"It is also, in our opinion," Seybold emphasized, "a far better machine. Both because of this and because of its much lower price, Lisa will certainly have far broader market impact than Star, and will be more important in influencing what happens from this point forward."

Xerox had to categorize its product and justify its success for particular office functions or management genres — the professional. However, Apple's approach was to place its Lisa in the realm of a product genre — it is marketed specifically for any owner of a personal computer. The six software applications programs reinforce this target area: Lisalist, Lisagraph, Lisacalc, Lisadraw, Lisawrite and Lisaproject. None of these packages are new to the world of management or executive workstations within an integrated office system concept. Wang, Burroughs Corp., Honeywell, Inc. and others all implement most of these concepts. Lisa, however, claims the user-friendliest approach.

Like the Star, Lisa has some basic problems that are important in any computer that performs business and office functions. In spite of the icon approach to file management, the implementation of a mouse for cursor control and the advantages in using the display screen for a myriad of multiwindowing capabilities, Lisa still is plagued by slow response times and a deficient WP package. OA consultants remind us that a new feature or system function will never take hold (with a resulting major market acceptance) unless the WP package is acceptable. The WP environment is becoming just as important as the DP arena in most of the Fortune 1000 companies. In spite of any graphics flashes or trend setting, Apple will not change this trend.

Apple's history is not without bruises. It has been nearly a decade since the Apple II technology was introduced to the pub-

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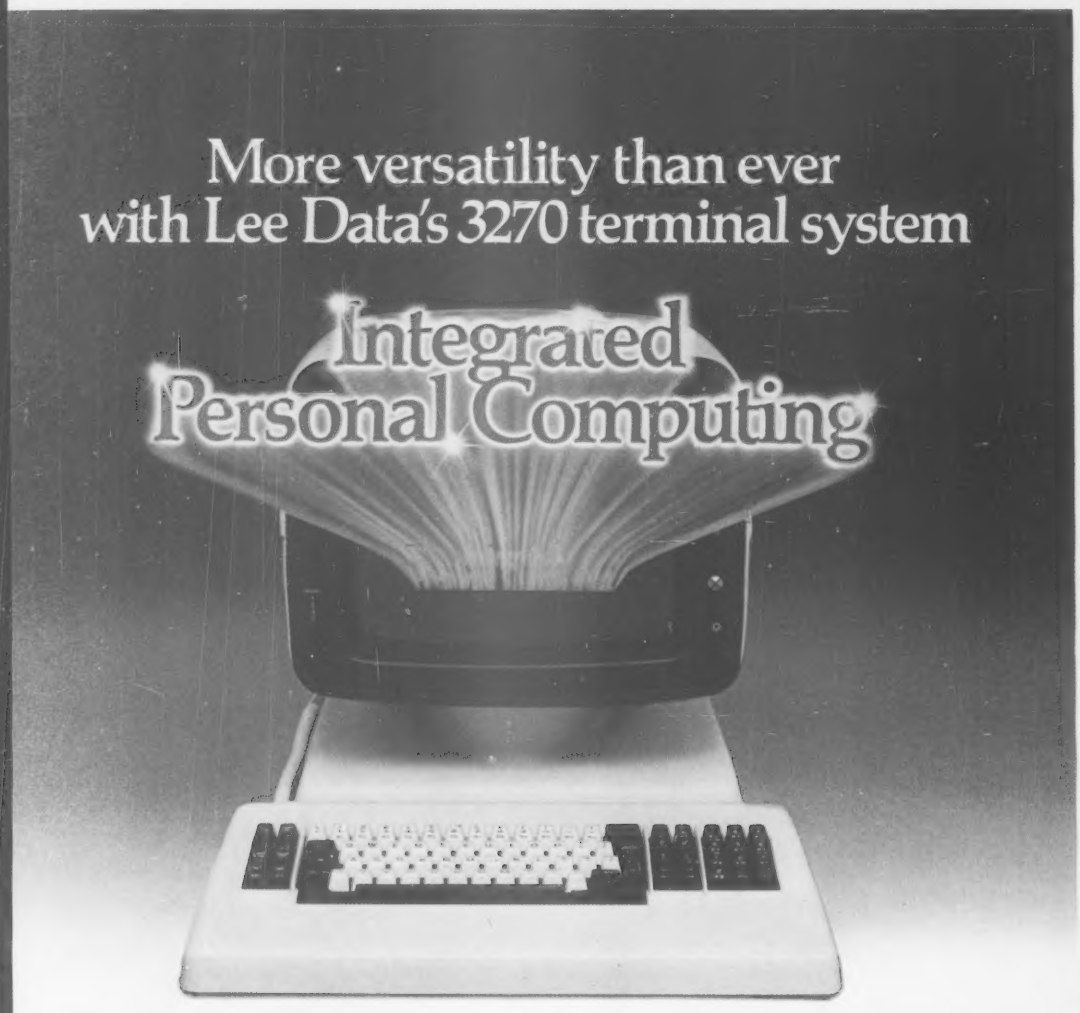

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lic, and the machine is still competing in an area where technology improves almost daily. Like Xerox, Apple has yet to solidify the image of repeating its original successes. The Apple III, also aimed at the office environment, had to be recalled to the factory in partial quantities after its first offering. It did not meet its originally designed specifications. Now that the Apple III is back on the market, its sales still leave something to be desired. Monthly shipments haven't come close to the 30,000-unit-per-month record the older technology of the Apple II. In fact, Apple III shipments extend just one-tenth of that number.

The simplicity of learning and using the Lisa, through its Lisaguide Help program, cannot be belittled. In the world of documentation, instruction and reference manuals are usually so complicated that only those proficient in computerese can hope to understand them. Nevertheless, it is true that Lisa cannot handle words with quite the same kind of facility. Lisawrite, the text processing program, is the weakest part of Lisa's six application programs. Anyone even remotely familiar with the word processors (or even programs on some personal computers) is likely to be disappointed by the slow or extremely cumbersome manner in which Lisa erases sentences or moves words around the text. The keyboard is as sensitive to touch as any electric typewriter, and there is an extended delay between the time a letter is typed and its recurrence on the screen. Apple can talk future enhancements, but the truth has to be based on current implementation.

Three years in the R&D area, Lisa's software alone has swallowed close to $20 million in revenues and 200 man-years of development. Moreover, the R&D cycle is not yet over, and an estimated $50 million has been given as a final projection. John Couch, the manager for Lisa, reportedly believes Apple might not have started the project if it had known the development resources required for Lisa's introduction and recurring costs.

The final comparison of Xerox and Apple is based on their similar experiences. Both Apple and Xerox have been driven to create the best of technologies for a business/OA system for the still untapped market target — the office professional. Both companies, therefore, have promoted modularity, ease of use and a revolutionary user interface.

Massaro, former head of Xerox' Office Products Division, and his deputy, Liddle, also a Xerox vice-president, have since exited the company and are off to start their own. It will be interesting to see what happens with Massaro's new venture, Metaphor Computer Systems, where he will now work on developing DP systems for the OA market.

John Shoch, Massaro's replacement, recently challenged Apple's Lisa in the pricing arena. In the "Reader's Report" of *Business Week*, he commented on what he saw as architecture and pricing confusion in the Lisa vs. Star comparison. According to Shoch, there is little merit in comparing stand-alone personal computers with workstations in an integrated office information system, and he restated that the price for a Star is $15,055, not $50,000 as reported in the comparison.

The main point, however, according to Patty Seybold, is that at the moment, Lisa should be viewed as an excellent tool for people who deal primarily with numbers, project scheduling, memos and other documents of modest length and interaction with mainframe and minicomputer systems. The Lisa (and in this area the Star is also a victim) is less enticing for people who must continue to deal with large volumes of words.

The problem is that office environments still contain a mixture of different types of people, administrative and professional, as well as the executive. The ideal office system will have to be strong in all functions so that everyone can use compatible systems and compatible data bases. OA

Bradford is a market research analyst for one of the leading vendors in the computerized text-processing field.

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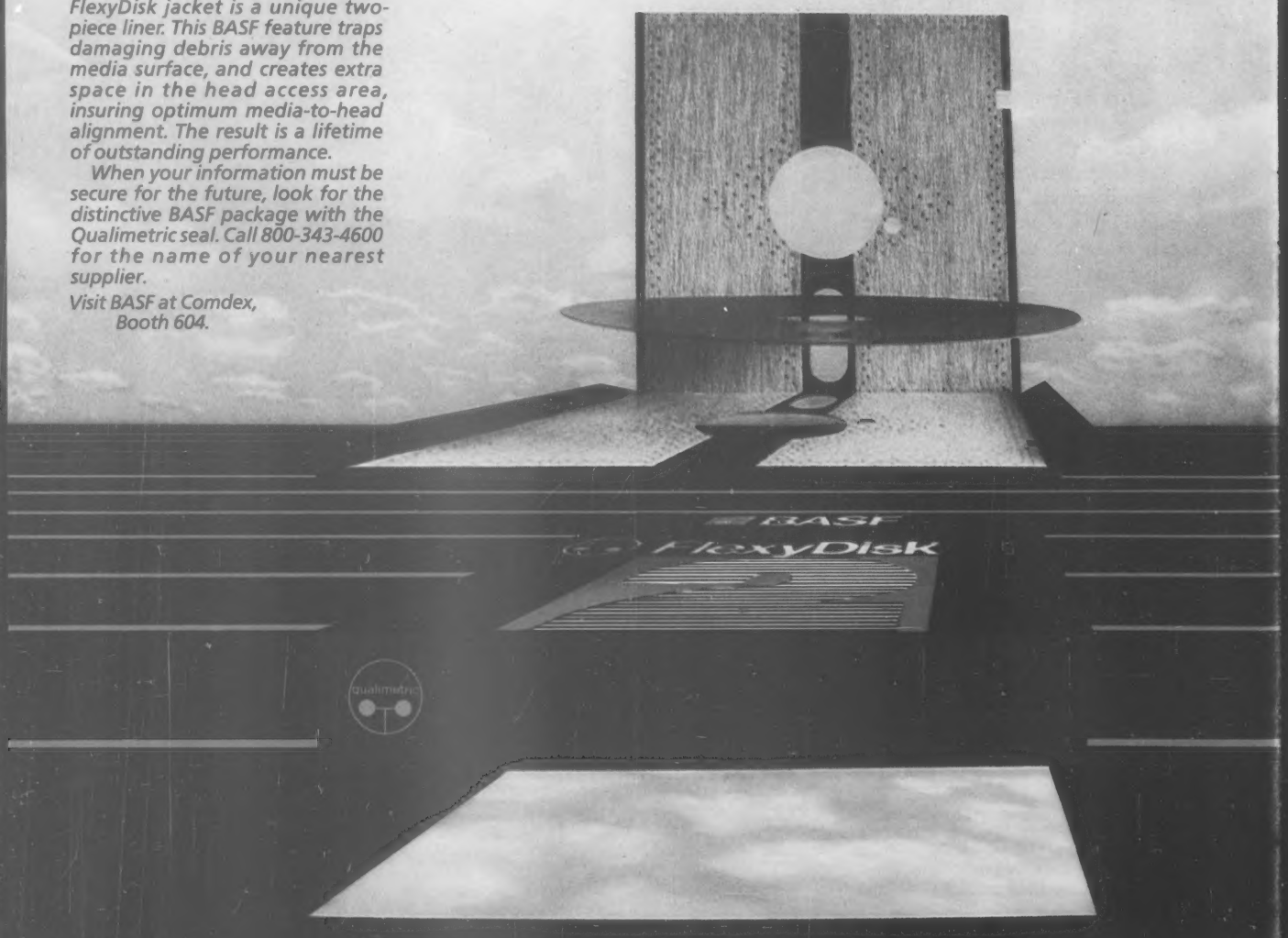

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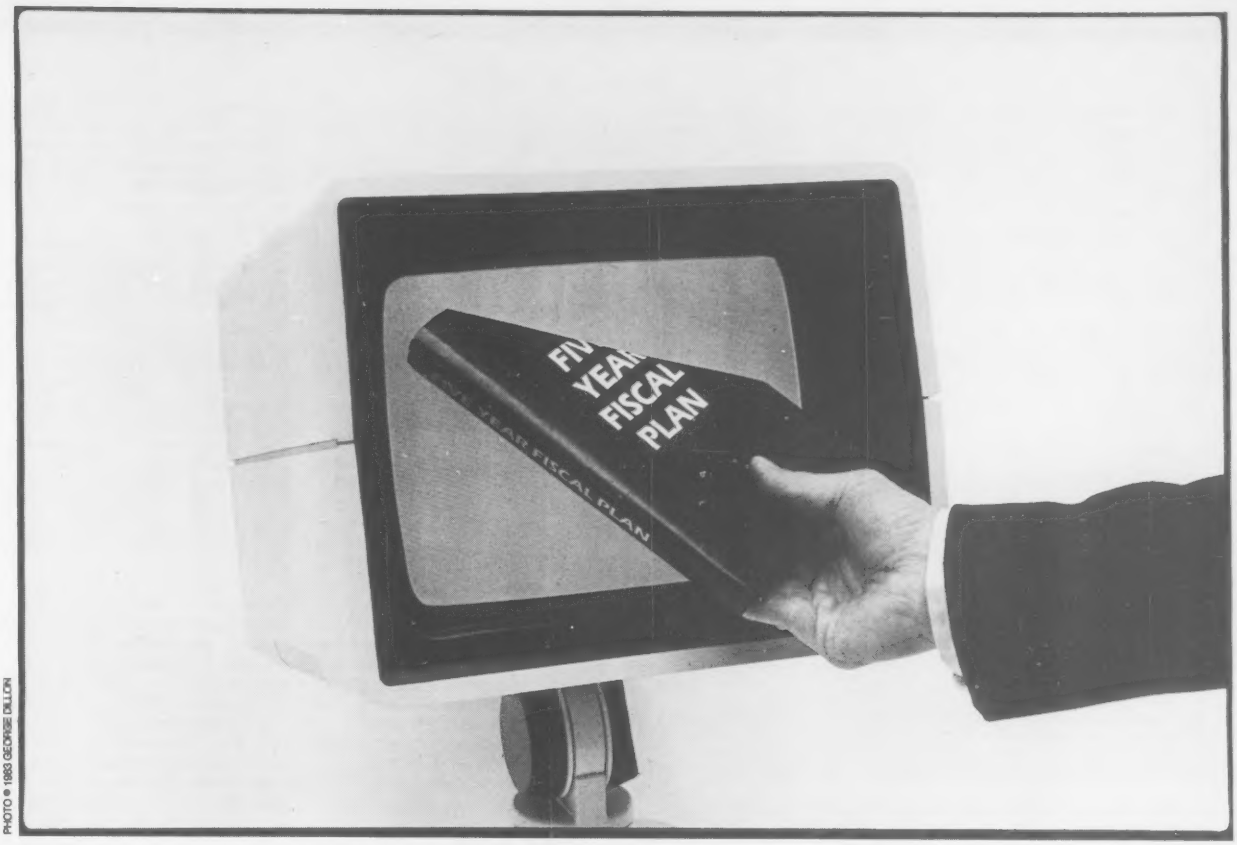

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Videotex

As users turn to data bases to meet their information needs, videotex will become a common office tool.

By Bernell Wright

No one correct method for automating an organization exists nor will it probably ever exist. While networking may be the answer for one office, a platoon of personal computers may the answer for another. And as the technology continues to develop, users may find themselves working with videotex to facilitate office automation in certain organizations.

Heavily influenced by increasingly sophisticated automation, the U.S. and major parts of Europe are shifting from industrial to information economies. Evidence of this trend has existed in the office environment for some time. Only recently, however, has this shift invaded the executive/professional work place, and as corporate managers plan and implement office automation systems in the '80s, the invasion may become a full frontal assault. Knowledge workers will be called upon to interact with data bases and mainframe-stored information, and they may not possess the computer literacy to do so.

Software is being developed to take into account the user's level of computer literacy, and methods are being found to make it easy and pleasant for users to deal with computer-based productivity. Software brings the promise of an appropriate interface to facilitate the man-machine dialogue — referred to here as "user-driven" solution.

Videotex can allow the economy, control and flexibility needed for successful implementation of white-collar worker automation. However, for videotex to exploit its service attributes in the business arena, new approaches to the system configuration will be needed. The traditional emphasis on mass market or residential users has helped to obscure the application-oriented use of videotex as a component in OA executive workstation implementation.

Before exploring the role of videotex in OA, however, we should review briefly the development of the concept of office automation. OA is frequently divided into four evolutionary phases:

- Data processing, starting in the late 1950s.
- Word processing, starting in the mid-1960s.
- Integration of WP with other functions. For example, WP merges with communications to produce electronic mail.
- A period of customization. Office communications system control will be customized for managers and professionals, some recognition of the multifunction workstation will be achieved and extreme user-friendliness will be emphasized.

In the U.S. particularly, we are in the third stage of office automation. Today's literature is awash with product announcements that extol the integration of discrete functions to produce the convergence of voice, video, image and data capabilities. This trend should generate optimism among users, but these vendor-driven solutions have rarely been developed with the user in mind.

In truth, many of these vendor-driven solutions have been aimed at creating a franchise for that vendor's equipment. This was clearly the strategy of Xerox Corp. with Ethernet. Although local-area networks have been and will continue to be major contributors to the advance of OA implementation, they do not fulfill knowledge workers' needs for user-friendly tools. Videotex can add new elements of user-friendly systems design, namely, communicators' control and cost-containment. This front-end-processor videotex solution supports:

- Screen bypasses through multiple entry point in logical fashion.
- Command-level functions that provide an alternative to prespecified screen fields and formats.
- Alternative screen formats for knowledge workers at different levels of computer literacy.

When and if these events happen, videotex technology will appear transparent to users, a key issue to knowledge workers seeking better solutions to existing problems or applications. The traditional stand-alone videotex terminal will be replaced by multifunction terminals that suport the merging of internal and external sources of data, voice, image and video routinely via local-area nets. Data base organization schemes will serve the user's needs, and the user-driven aspects of videotex could emerge as a major contribution to fourth-generation office automation.

What is videotex? Historically, videotex, first known as viewdata, has undergone many definitions. One of these comes from Europe, in the form of a standard for videotex. Set by the Conference of European PTTs (Cept) this standard incorporates the national efforts of British Telecom's Prestel and the French authorities' Antiope. The Cept standard can best be seen as a political accommodation to two competing system technologies from the continent as they approach the world market.

A North American standard also exists for videotex. This standard, also known as the Canadian CRC Technical Note No. 709E, incorporates the AT&T Presentation Level Protocol with Canadian Telidon technology. The standard provides for encoding text and graphics information for optimal communications. It is a display standard, which, from a systems architecture focus, defines the presentation layer within the International Standards Organization's multilayer Open Systems Interconnections Reference Model.

The issues involved in setting the above two standards are very important, but they fail to cover product and market development issues. A broader definition is more useful here. Videotex is:

- A generic term used throughout Europe and North America for two-way information retrieval systems using telecommunications lines, mainframe and computer/terminal configurations.
- An umbrella term for low-cost, easy-to-use interactive information retrieval systems.
- A series of attributes with technological alternatives that displace current status quo solutions with lower cost or value-added solutions (productivity enhancements).

Videotex, then, is really a concept that includes attributes and technology directed at placing more of the burden of man/machine dialogues on the machine and less on the man. This is the real meaning of "user-friendliness" in the computer context.

In this larger sense, videotex should be seen in the same light as the new computer terminals symbolized by Xerox's Star and Apple Computer Inc.'s Lisa. While the hardware of both is significant, the real story is in the way these products approach software. Instead of making the target knowledge worker learn computer commands, they allow him to manipulate pictures that let work be performed in ways the user finds familiar. Carrying this concept to its natural conclusion, videotex and personal computers with template command processing can be considered as a transitional technology. The ultimate in user-friendliness for knowledge workers is achieved through voice recognition/synthesis technology. An example of this is digital speech interpolation (DSI) which promises unlimited personalized information processing and transport at home, office and in between.

However, no products have yet reached this level, and the technology is still some years off.

How is videotex deployed? Vi-

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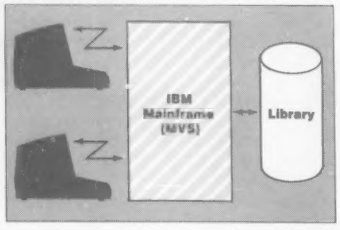

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deotex technology has also undergone several changes in topology. In fact, in the OA context, videotex is an expansion of network access and data base organization issues, all culminating in front-end-processor technique. An evolution of videotex network architectures follows:

- Prestel: Targeted at the residential market; low-cost, simple-to-use, closed data source.
- Bildschirmtext: Targeted at the residential market; low-cost, simple-to-use, opening of data source gateway concept, closed user groups.
- French Videopad/AT&T proposed standard: Boolean logic, closed user group extended, use of a packet-switched network or full connectivity via public switched telephone network (PSTN), to unlimited data source.

Prestel began as a closed system that linked internal data bases for information only. Further, because Prestel pages were preconstructed prior to transmission, no concept of merging inputs was possible. Bildschirmtext, with its gateways or windows to external or third-party data bases, opens up the network and supports X.25 access. Business users without networks can become closed user groups and treat the Bildschirmtext backbone as a service bureau of value-added networks. Analysts will see the similarities to the new IBM Information Network and American Bell's Advanced Information Services Net 1000 offerings.

The now-developing French Videopad program and AT&T presententation level protocol activity brings traditional business user search technique — specifically, boolean search or logical connectors using "and," "or" represented by a comma and "not." In addition, they bring a PSTN backbone network for full connectivity or packet-switched network for interoffice and intraoffice communications and transaction processing.

Videotex in the OA initiative. Videotex can be a part of the OA evolution because of the concept of front-end processing. The videotex front-end processor gives vendors and users two major capabilities: communications control and screen management.

We expect to see front-end flexibility as a part of user implemental solutions. This means users will have an in-house base of intelligent workstations. Intelligent terminals can perform videotex processing of information off-line, which will allow users to control the actual telecommunications session and its cost. The ability to provide cost-containment and information management through gateway and screen management capabilities of videotex are key inputs to OA users.

"Videotex could emerge in the form of new options on time-sharing bureaus, as well as on information retrieval services."

Communications control is becoming increasingly important in an environment where multiple delivery schemes — voice, video, image and data — are becoming available. Cost-justification for various communications media is now a central task in evaluating implementation. With the increasing flexibility of communications comes an increased need for protocol conversion. As more devices are interconnected, a common protocol is needed; since there is no common protocol, protocol conversion becomes important.

Not surprisingly, protocol conversion is one of the value-added services that AT&T's new ABI subsidiary will supply. It is also one of the value-added functions that a videotex front-end processor can supply, where the primary conversion is from Ascii or IBM protocols into videotex protocols. The videotex protocol itself is one of the emerging major standardized languages for text and graphics. As the videotex standard is resolved in the next two years and its ability to serve as a common reference point for data communications emerges, the ability of time-sharing and telecommunications entities to use videotex for protocol conversion will be greatly enhanced for users.

The second capability — screen management — is derived from the issue of protocol conversion. Screen management is the capability to merge data interactively from an external or an internal source with user-friendly videotex format. The videotex page serves as a mask for the non-videotex-format information source. In this light, videotex truly becomes a communications vehicle, rather than a new stand-alone rigid information format. The front-end processor's screen management capability supplies the necessary flexibility to allow videotex systems to be employed in a cost-effective fashion in office information environments.

In this context, videotex is no longer videotex perceived as a distinct and somewhat limited information format. With the screen management capability, it becomes a common friendly context for all information needs. The result is a complete management information system for knowledge workers. This is, of course, the goal of many OA and information vendors.

When examining the movements in videotex toward a cost-effective solution for communications and screen management, we can see videotex joining office automation by becoming a solution that can be implemented by the end user. Vendors in Europe were early in sensing this. Aregon Group Ltd. and Rediffusion Computers, Inc. in the U.K. have become OA videotex vendors by supplying turnkey systems for end-user implementation. Both are now in the U.S., as are scores of turnkey software systems houses.

Videotex could then emerge as new options on time-sharing bureaus, as well as on information retrieval services. The basic question is why — given the fact that graphics are nice, but not essential to most DP/information retrieval applications in use today. One answer is that the knowledge worker/end user has no allegiance to the DP department. He isn't seeking a formal data base management system, but an integrated nonproprietary management information system. He isn't looking for increased data flow, but rather for increased decision capability. Graphics help when they are recast as synthesizors of detail. For example, a pie chart depicts all distribution outlets for a product, a time series depicts years of sales performance.

Another answer is that videotex technology is volume-dependent — knowledge workers will open up a new class of low-cost terminals and terminal enhancements that will make computer power from in-house or remote installations more available.

One more subtle answer — borne out by the apparent success of Rediffusion's Viewdata Plus program — is that videotex serves as a nonproprietary approach to data management. Videotex is a generic data management system readily understood by users who may not know the ins and outs of a proprietary data base management software offering. With the quickly developing offerings by IBM Information Network and ABI's Net 1000 in addition to other time-sharing computer processing services, videotex may be a sales strategy component. Videotex front-end solutions are likely to leverage some vendor offerings because the videotex capabilities will appeal to the decision-making team that includes high-level end users as well as traditional MIS planners. OA

Wright is manager of the videotex programs at Link, a research company based in New York.

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Word Processing Procedures for Today's Office

Mary Jane Forbes, Digital Equipment Corporation

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A very thorough job of describing the mechanics of word processing that go far beyond typing and editing and into the world of creativity.
Beverly F. Watson, Executive Secretary to the President, MITRE Corporation.

This practical guide and reference picks up where word processing instruction manuals leave off. *Word Processing Procedures for Today's Office* applies current word processing technology to routine office tasks and procedures.

Word Processing Procedures for Today's Office is for the advanced word processing user or student, for managers exploring the capabilities of word processing, and for office managers, word processing center managers and operators, record management people, and word processing teachers.

The book is divided into four parts. *Part I. Playing by the Rules*, is a general discussion of the uses and advantages of word processing and shows how to establish rules for handling repetitive activities. *Part II. Using the Inherent Power of Your Machine*, looks at using keywords for filing and retrieval purposes, for list processing, and for user defined keys. *Part III. Office Administration*, shows how to maintain common office records on the word processing system: telephone directory, mail log, message log, tickler file, and a variety of calendars. Each chapter in this section examines one of these common office records, shows how to transfer it to a word processor, and finally, how to run and maintain this newly automated office record. *Part IV. Communications*, is a general introduction to electronic mail and the electronic office.

Two appendixes provide detailed examples showing how to apply the material in the text to specific applications.

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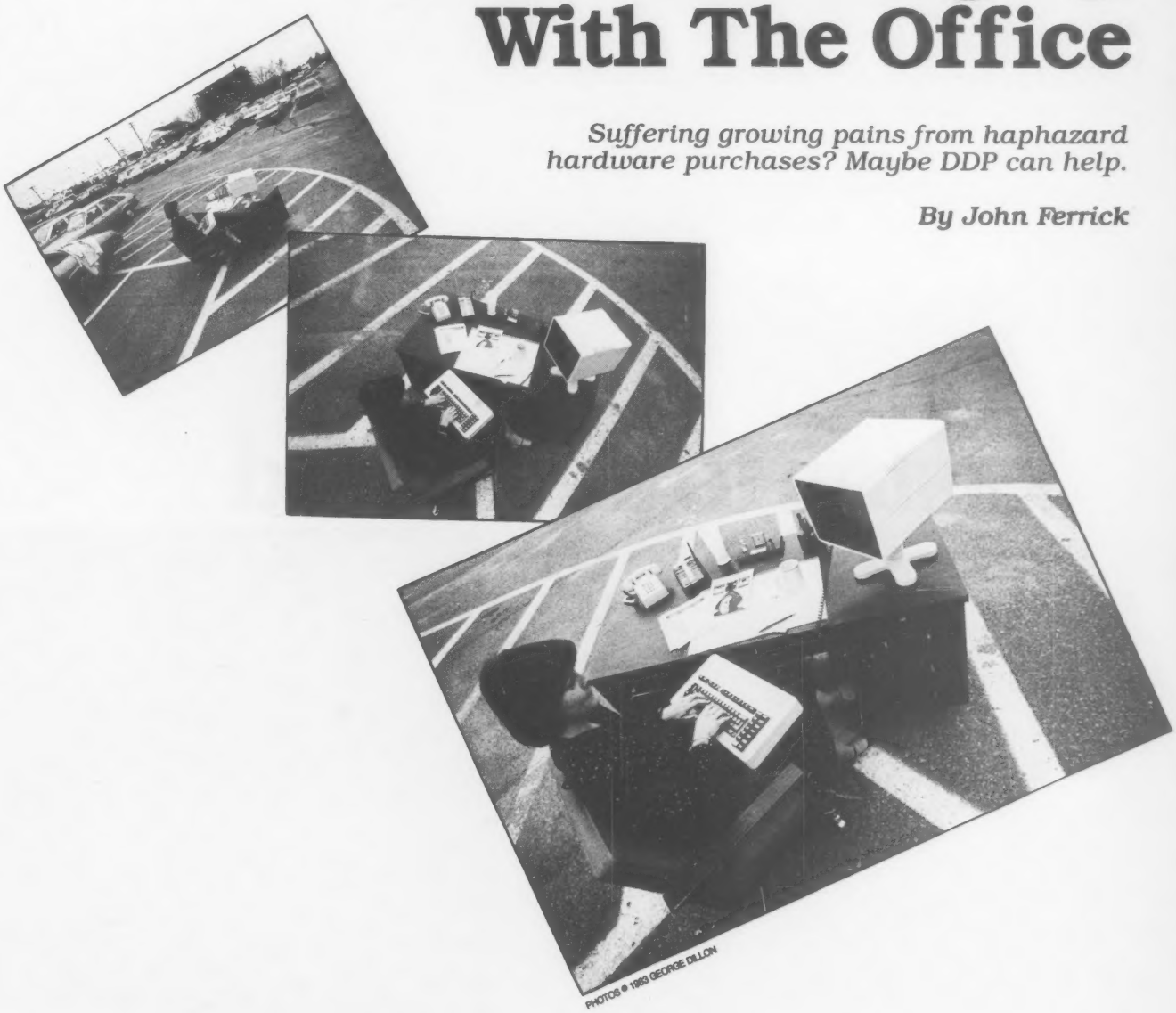
DDP: Linking Up With The Office

Suffering growing pains from haphazard hardware purchases? Maybe DDP can help.

By John Ferrick



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As businesses within the information economy establish more regional offices and disperse their centers of operation, they will enter a new phase of office automation. This stage involves the installation of on-line data processing and communications between corporate branches. It means distributing data processing via compatible equipment and integrated communications networks.

This evolution toward interoffice automation means more extensive and efficient use of equipment, and it provides an opportunity to link diverse business segments into a cohesive whole. As the corporate areas of marketing, accounting, manufacturing and remote sales become parts of an on-line community, productivity will increase.

In many cases, the use of automation equipment has grown as fast as the technology has evolved. Users are no longer content with slow batch information processing methods. Corporate personnel want the data they work with to be the most current, and they want it processed fast.

To date, no one vendor has captured a majority of the OA marketplace. In an attempt to discover first-hand which systems work best, corporate OA buyers have been forced to sample the many available offerings. Many companies are finding they have a mass of incompatible hardware. If OA equipment cannot be integrated, each new addition complicates the already chaotic state of office communications.

Equipment currently falls into two main categories, stand-alone and shared logic. A third type, the shared-resource system, has also gained popularity recently.

Stand-alone systems are typically personal or small business computers that individuals have purchased in an attempt to introduce some form of desktop computing power into the office. These processors usually have differing communications protocols and, as a result, they cannot talk to each other.

In contrast, shared-logic systems are composed of numerous dumb

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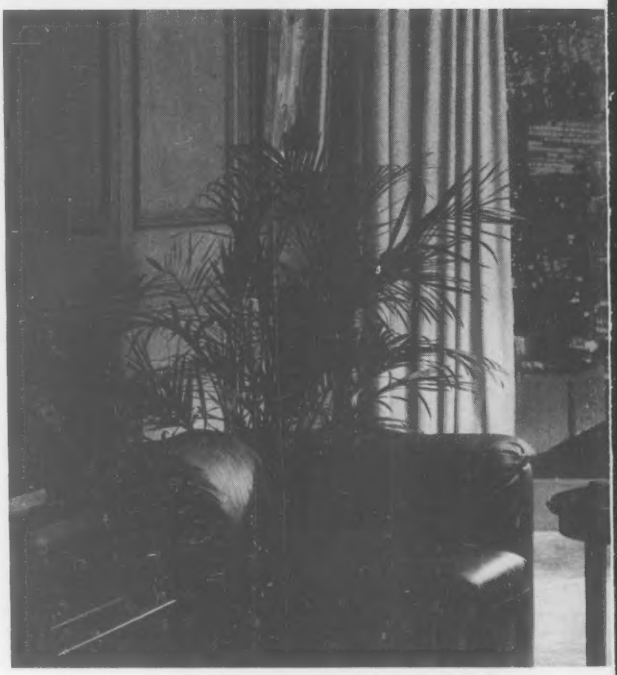

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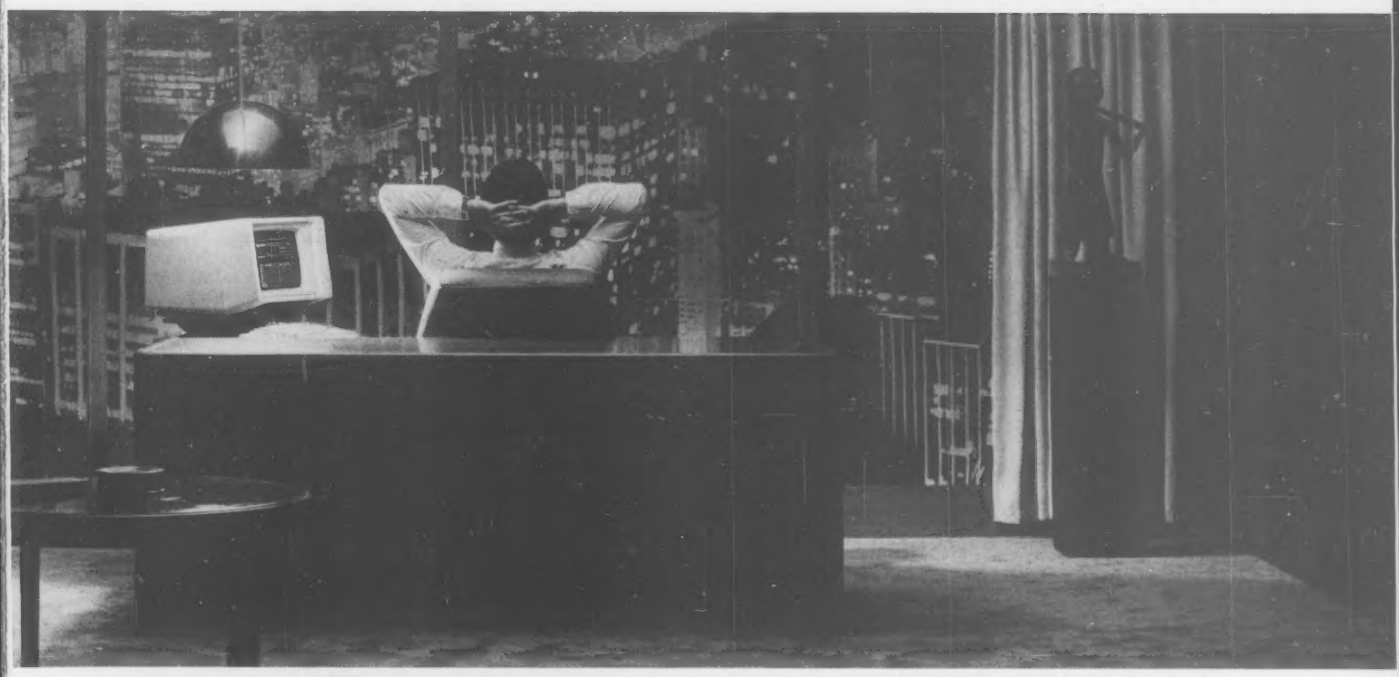

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CRT terminals, which are all linked to the same host computer. Users often wait for the overloaded CPU to process requests. CPUs in a shared-logic system are capable of supporting a limited number of terminals.

The shared-resource concept combines the best aspects of the stand-alone and the shared-logic systems. Applications software resides in the central processor, and individual files are downloaded to smart terminals when the programs are accessed. These terminals perform the DP transactions themselves, which speeds task processing. Sharing resources reduces CPU contention and allows the same size processor to support a greater number of intelligent terminals.

The very existence of so many OA devices has led many corporations to develop a list of prepurchase criteria for an acceptable system. To ensure a more productive fit into a large organization, an OA system should be able to do the following:

- Provide central site control.
- Eliminate data interchange incompatibility between systems.
- Minimize the skill required to support the system.
- Remain easy to use, while providing tools for the nontechnical user.
- Satisfy the needs of both end users and programmers.

In short, before companies invest any further time, personnel or money into OA they should make sure they are getting the capability to unite distributed systems with a reliable communications network.

Distributed data processing (DDP) systems provide the perfect corporate expansion path for companies suffering growing pains caused by haphazard hardware purchases. Ideally, integrated DDP systems consist of compatible equipment and a communications network that allows information to be sent to and received from all linked processors.

It is difficult to find hardware flexible enough to satisfy the diverse needs of nontechnical end users, the DP staff and corporate management.

The average system user wants an easy-to-use system with no fuss and the powerful OA capabilities of word processing and data entry.

OA equipment termed "user-friendly" is usually designed to meet these user needs with little thought to any problems it might create for the programming staff. Most programmers are trained in Cobol and are familiar with IBM 370, 3080 series and 4300-type architecture. However, many OA products require programmers to step out of a career path in order to learn obscure programming languages and nonstandard system architectures.

Generally, data center management favors office automation and distribution of hands-on data processing among nontechnical users. The system must, of course, remain easy to program and maintain and must not require learning multiple operating systems, programming languages and communications protocols. To be programmer-friendly, an ideally designed DDP environment should allow the programming staff to remain at a central company site. This leaves a knowledge pool of software support and maintenance in one location, instead of spreading it thinly around the country.

Most systems were designed to be either user-friendly or programmer-friendly. What corporations want most is a computer system composed of compatible hardware that satisfies the needs of both groups. Once found, this OA equipment will meet the organization's needs best as part of a distributed communications network.

DDP systems can be managed and controlled from a central corporate site. This benefits programmers, users and management alike. Keeping a highly skilled DP staff in a central location makes better use of programmer power and allows them to continue working on a familiar system. End users like having the system maintained for them from headquarters because they can concentrate on the work at hand rather than on the hardware. Finally, DDP allows corporate management to guide and oversee DP activities on a daily basis. Installing a communications network of compatible systems in an organization helps it to function more harmoniously and increases operating efficiency.

The first steps of any new project are usually the most difficult, and this is true of implementing DDP. Before buying a single additional CRT terminal, organizations should perform a thorough OA evaluation. This entails looking at what is already on hand, studying what is available and finally deciding what is needed.

A primary consideration for the existing DP equipment is whether it will constitute a good basis for an integrated communications network. Are all of the compo-

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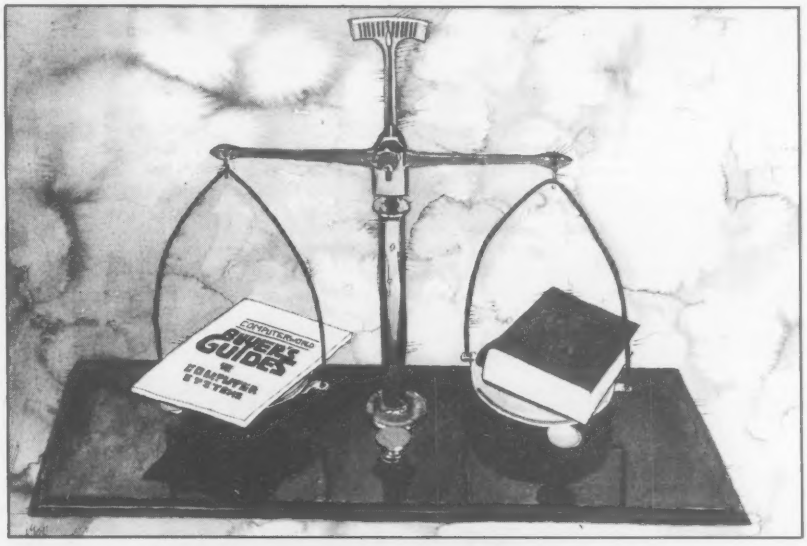

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nents compatible and are they capable of supporting network communications? If the current system will not lend itself to distributed processing, it may be more cost-efficient in the long term to purchase a system specifically designed with compatibility and communications in mind.

Before buying new DP equipment or adding to the old, corporate growth should be plotted. Does the system provide an upgrade path? If the company continues to grow and the equipment does not, a new stumbling block will quickly be reached.

If new system components have to be purchased, are they software compatible? The corporate software investment is wasted if the buyer later finds they are not.

What is the stability of the company? Will the system adapt to any future changes? Can hardware components be added as needed, and can networks be tailored for various configurations? These considerations can be critical in the constantly fluctuating corporate world.

Does the vendor under consideration offer a personal computer option? This feature can be a great asset if busy executives will be using the system. Personal computers have many application software packages available to them that a mainframe-based system does not. Two popular personal computer software modules include electronic spreadsheet generation and business graphics.

Finally, does the intended system measure up to the expectations of all user groups — programmers, nontechnical users and corporate management? If it does, then the important criteria for a workable distributed data processing system have been met.

After examining the existing corporate OA status, a company can look for key hardware features. All office automation CPUs should be able to communicate:

- In a peer-to-peer network.
- As part of a local-area network with terminals and peripherals.
- With mainframe computers.
- Even in the event of a processor failure, by virtue of an independent communications facility.
- With communications networks.
- Interactively with any application program on any other system in the network.

If a system possesses the above communications capabilities, users in all distributed corporate locations can reap powerful benefits. Remote branches have the means to interactively access data stored in the company's central data base. In addition, headquarters people will no longer waste time waiting for field-generated printouts or tapes.

An added benefit available on some DDP systems is the separation of the communications and DP functions. This allows users to connect to another processor in the network should the local CPU fail. Used in this way, distributed data processing can ensure that users will never be without processing power.

When organizations have gone through the scenarios outlined above, they should have:

- Realized that the demand for on-line DP in distributed locations is increasing.
- Taken stock of existing corporate DP and discovered the inefficiency caused by random purchase of OA equipment.
- Investigated the alternatives and decided to implement a communications network of linked DDP systems.
- Performed a thorough housecleaning and removed equipment that will not function well in a network.
- Decided which type of system will best integrate the entire company.

One final step remains to align everything and everyone in the organization: the development of a corporate master plan. The various pieces correctly combined can compose an ideal DDP system. Those state-of-the-art mainframes, remote processors, terminals and peripheral devices are all within reach today. Finding a single system to please an entire company takes careful research and long-term planning, but it can be done.

Initially, the proliferation of DDP systems can make selection difficult. Most OA vendors are offering some type of communications or networking devices. As the trend toward integration continues and more information becomes available, making these decisions will become easier.

In the interim, the companies that have done the market research and generated a master plan will enjoy the benefits of the next phase of office automation with distributed data processing.‡

OA

Ferrick is marketing director for distributed and intermediate systems for National Advanced Systems in Mountain View, Calif.

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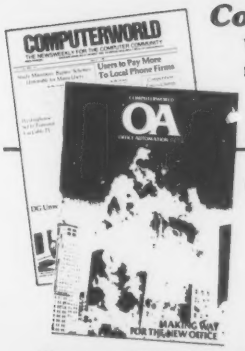

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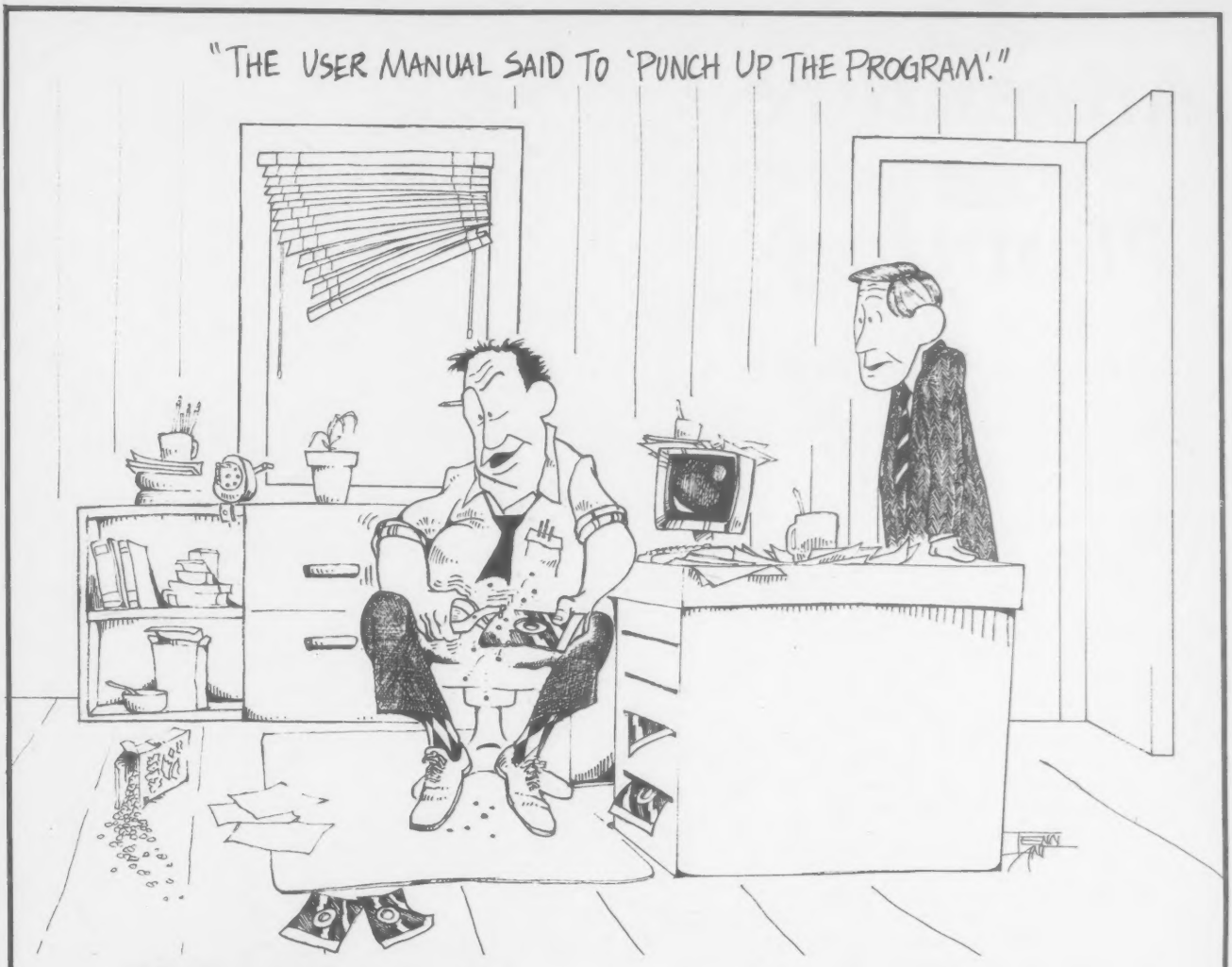

The next issue of Computerworld OA takes a hard look at OA software.

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The OA Focus section of the next *Computerworld OA* will provide comprehensive coverage of data bases, software conversions, decision support systems, information centers, the user interface and much more. We'll showcase vendor directions, what benefits are available now and what users should plan for in the future. We'll summarize the latest information from developers and highlight emerging trends in order to bring both long-term and specific guidelines to those responsible for planning and purchasing software for their organizations.

In addition to the OA Focus on Software, *Computerworld OA* will feature a survey of real users of information centers, present a case history of a large bank user and will have articles on subjects such as cost justification, ergonomics and remote work sites.

Computerworld OA keeps you up-to-date on what's happening in *all* aspects of office automation with articles on new technologies and trends, and overall OA strategies. And, in every *Computerworld OA*, we take a closer look at a key issue in our special OA Focus section.

If OA planning and decision-making is important to you, you'll want to read the next issue of *Computerworld OA*. The issue date is June 15. The deadline date for advertisers is May 6. (Materials are due one week later).

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Computerworld OA:
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An Adventure In Planning

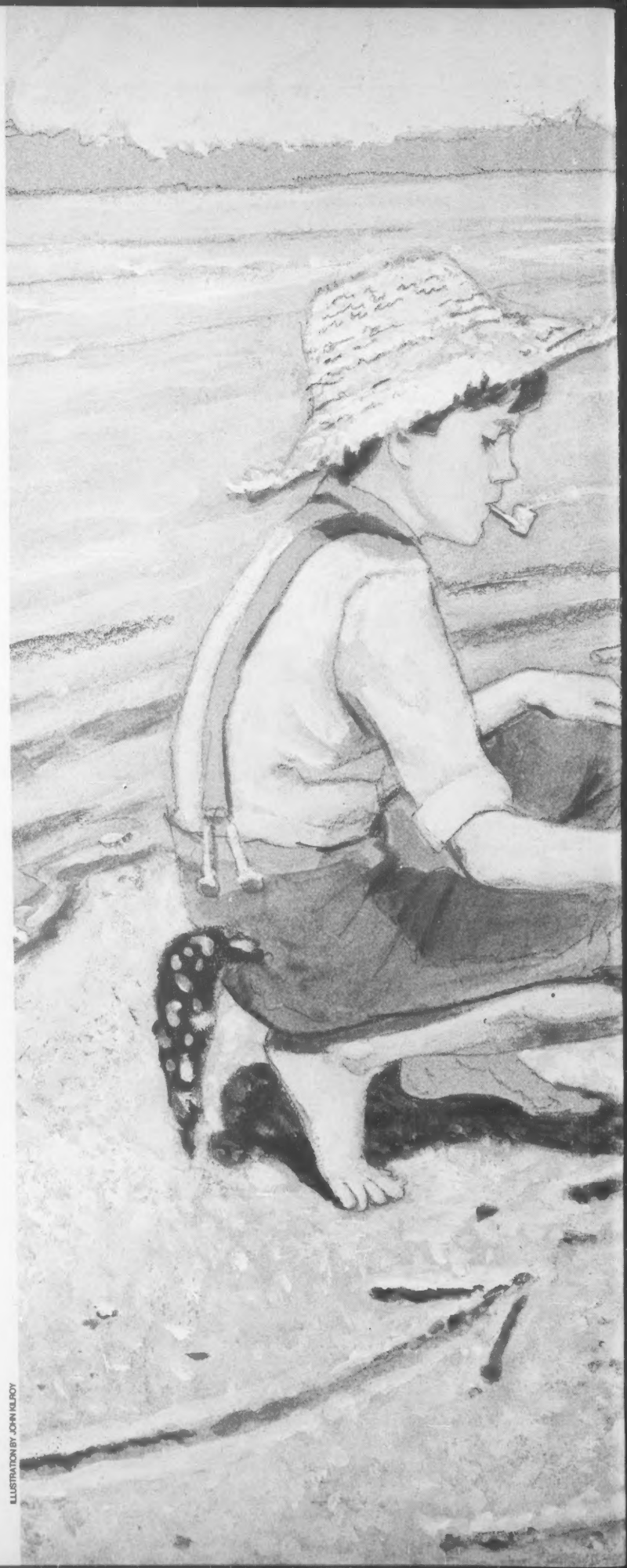
Planning for OA must be as integrated throughout an organization as is the computer technology.

By Cornelius H. Sullivan Jr.

In the closing chapters of America's greatest story, Mark Twain's youthful heros try to rescue Jim from slavery by two very different means. Huck expects simply to wander onto the Phelps plantation, locate Jim, unlock his chains and head for the river, "not fixing up any particular plan, but just trusting to Providence . . ." Tom Sawyer thinks this is "too blame simple." His scheme makes considerable use of underground tunnels, frogs, mournful inscriptions, bizarre chants and other aids gleaned from pirate stories, magic, romantic fiction and a fertile imagination. "Real mysterious, and troublesome and good."

This reminds me of what is going on in office automation. Although dismissed by literary critics for being a disjointed and irrelevant ending to an otherwise masterful tale, the conclusion of *The Adventures of Huckleberry Finn* is actually a carefully constructed analysis of the alternatives arising from modern complexity.

Neither naive reliance on intuitive wisdom nor bogus scientism will be likely to produce winners in the burgeoning information industry. The purpose of this article is to describe a better approach. In order to manage technological change, three perspectives must be kept constantly in mind. One is that of the technician, whose view of



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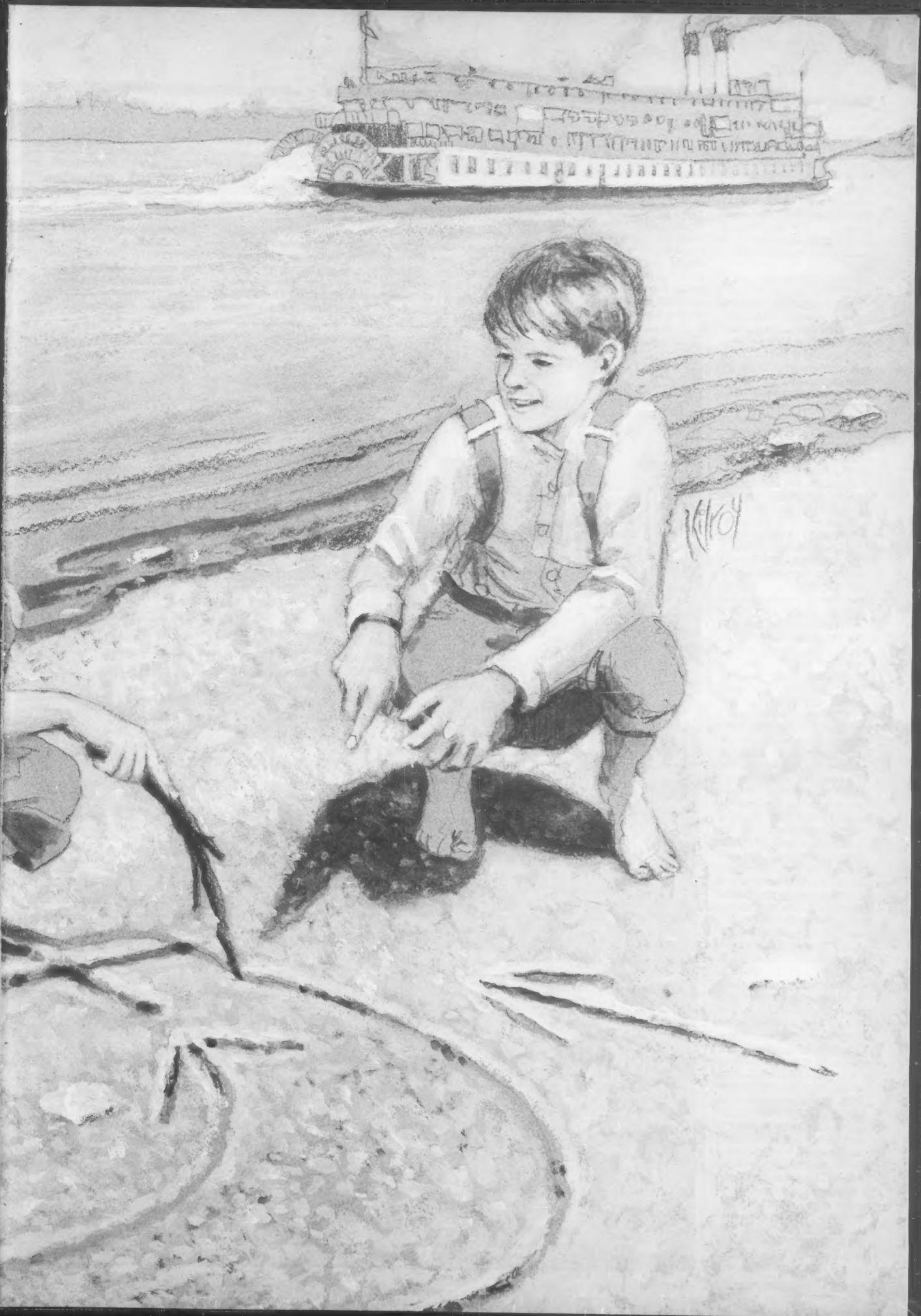

quality is closely linked to the quick adaptation of new technologies. Another is the view of the user, whose idea of quality is functionality. The third point of view is that of management, for whom quality is a sound business case.

A strategy encompassing the tensions and interaction of these three basic perspectives is the pragmatic alternative to simple pioneering and overwrought planning. The framework can set project priorities, govern program dynamics and guide organizational change. Moreover, I think it will prove useful beyond office automation for managing subsequent emerging technologies.

Success stories in office automation so far are generally tales of pioneers. These were the brave souls who ventured onto this new frontier of information technology in the late 1970s, armed with vision but unencumbered by close management scrutiny. The pioneers were part booster, part technician. The office was their safety valve. On one hand, pioneers were seeking a last fertile field for automation; on the other, they sought to escape beyond sight of the chimney smoke of civilized DP into the uncharted land of knowledge work. To them the office was a combination of virgin land and primeval wilderness.

The contributions of the booster/technicians are clear. Their ventures gave OA its early character as an antithesis to the stifling controls of the traditional data center's "Stage 3." OA emerged as the first real attempt of information technology to be user-friendly and human engineered. This, in a word, was the making of Wang Laboratories, Inc. Moreover, the pioneers helped to set the scope of OA. Out of their systems development forays emerged the major products now associated with office automation: text editing, electronic mail, document management and personal computing. Because of the pioneers, the field took shape as an eclectic blend of word processing, DP and communications technologies.

The limitation of pioneering is no less clear. The booster mentality, glossing over many pitfalls and complexities, is well summarized by the title of one you-can't-go-wrong article from the period: "The Office of the Future Is Now." Also, for all their individualism, some pioneers carried the cultural baggage of DP with them onto the frontier. Many early WP implementations, for example, looked suspiciously similar to computer rooms. Filled with a buoyant optimism, the pioneers expected to wander into the office, not fixing up any particular plan, but just trusting to Providence. These were the Huck Finns of OA.

However, many corporations do not have a culture supportive of the novel. At these firms, and even at more adventuresome or experimentally oriented companies, there is a need for formal strategic planning. And planners have risen to the occasion; indeed, the movement is replete with methodologies.

Unlike the pioneers, planners are frequently more interested in organizational and behavioral change. Social scientists, like the poor, ye have always with you. Their contribution is to move beyond the general tool-orientation of the pioneers toward specific systems products meeting functional needs of the business. In short, the behaviorist/marketers segmented the market.

This perspective has been urged on by a spate of multiclient studies run by universities and consulting firms. Considerable effort has been expended in these forums to fathom the user's perspective and

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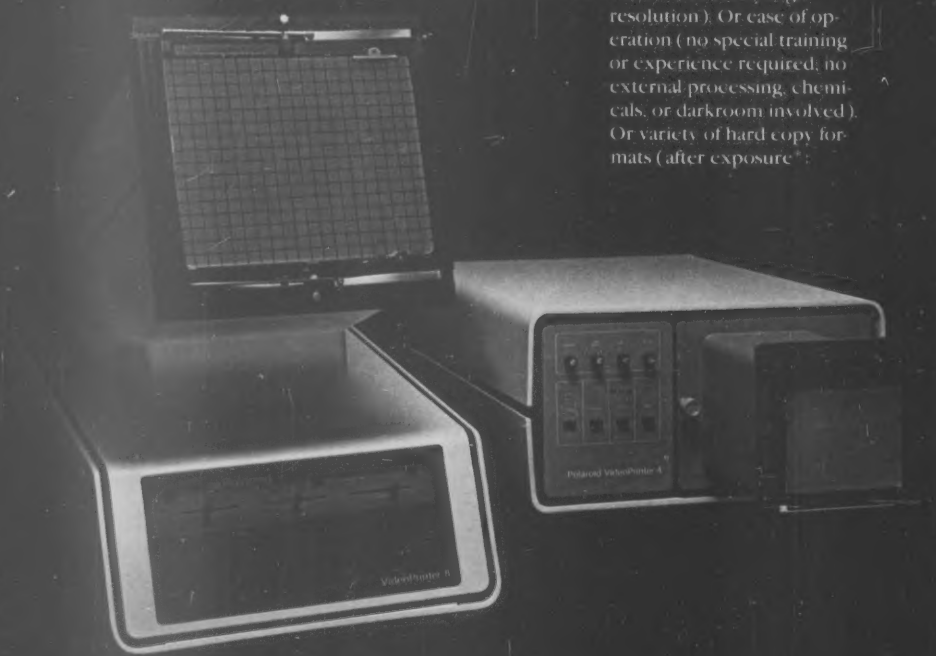

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make systems functional with respect to a given business activity and acceptable at the man/machine interface.

The limitation of the planners has been that they tend to bog down in an exercise called "Name the Program," where nothing happens because nobody can define or compartmentalize precisely what OA is. In addition, planners become immersed in their own methodologies, which take on a life of their own quite apart from their usefulness in the change process. Early signs that things were getting out of hand were the doctoral dissertations that began to appear from major schools of business administration. My favorite introduced something called "augmented Petri nets." Tom Sawyer would have liked that.

Undoubtedly, both of these perspectives on innovation have something to contribute; OA is clearly interdisciplinary. But there are shortcomings to a single-minded technical or functional orientation. By themselves, the popular approaches seem incomplete, even tangential. Yet, it is not enough to combine their strengths. What is missing from these points of view is a management perspective. Boosters, technicians, handwringers and manipulators seem primarily to be talking tactics. They sidestep the basic question: What is the fundamental justification for this technology? Does it make sense for our company? What, in short, is the business case?

Technical sophistication, user-friendly equipment and sensitive implementation tactics are important, but no aspect of the process of automation is more crucial than the construction of a meaningful and compelling investment analysis. This is particularly challenging and important for emerging technologies, such as OA, because they broaden the horizon of the possible. Opportunities must be transformed into reality either by matching them to existing business objectives or inspiring the creation of new ones.

In addition to the technical and marketing points of view, therefore, a third element or perspective must be kept in mind. Whereas the others focus on technology supply and demand, this perspective is oriented toward incentives and control. Systems may now be justified in hard-dollar terms not only on the basis of reducing costs, but also because they generate revenue, improve customer service, support a new form of organizational design for the corporation or improve the quality of work life for employees. What is important to note is that not all business cases are of equal importance or timeliness at every firm. Furthermore, the relative importance of the cases will vary over time and across different parts of the business. In addition, there is no single source of authority for the business case.

The business case should not be used in isolation, nor should it necessarily override the other two perspectives. The creative return-on-investment analyses devised by systems proponents to justify projects are good examples of the limitations of tunnel-vision accounting. The technical and functional merits of a proposal are no less important than the business case, even if they are more difficult to understand. Indeed, it is only by combining them that new ideas can be completely evaluated — in terms of all three kinds of quality. The balanced perspective considers all three viewpoints.

The appropriate framework for analysis of office automation is therefore a three-dimensional construct, such as that depicted in Figure 1 on Page 83.

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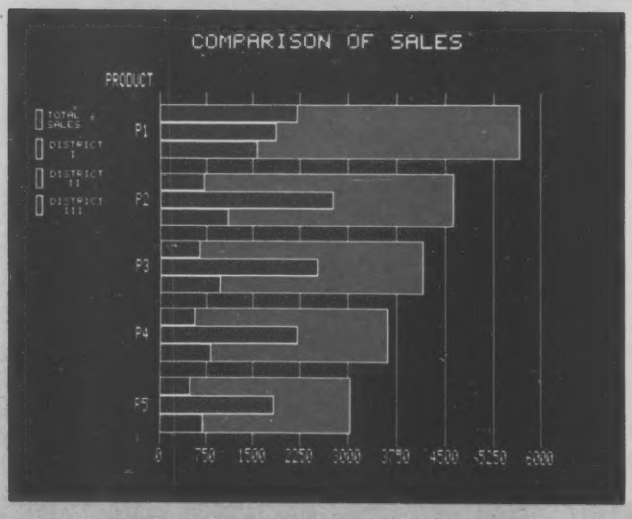

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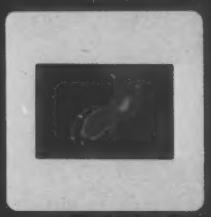

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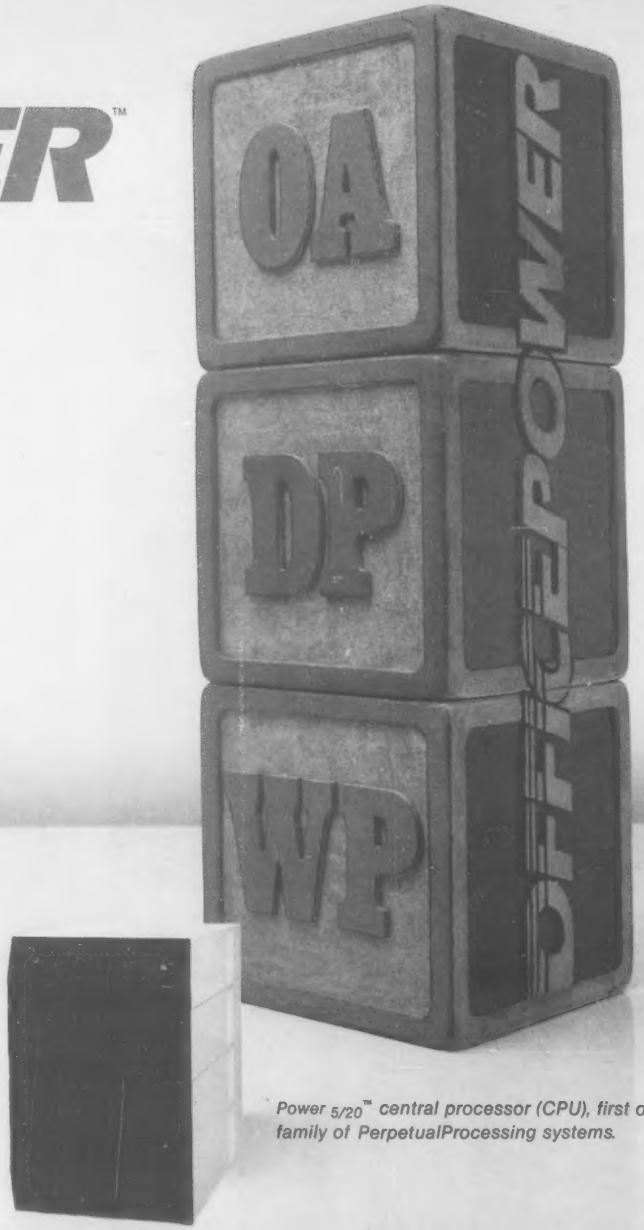

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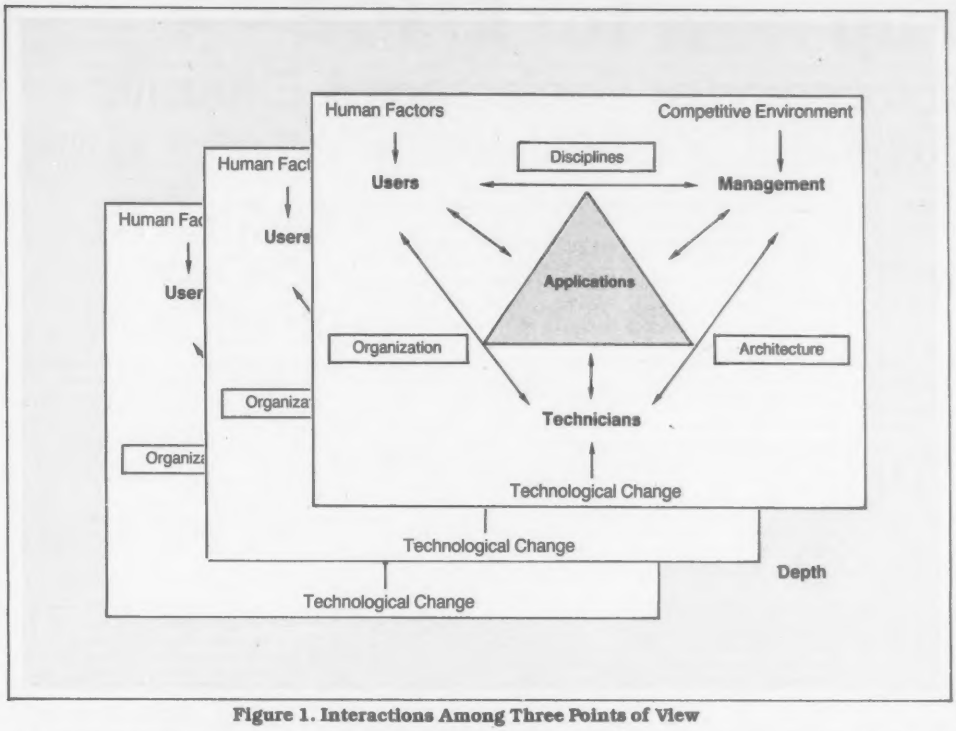

Figure 1. Interactions Among Three Points of View

The basic forces that determine the program issues are the perspectives of the technician, the user and management. Each viewpoint is legitimate and should be taken into consideration, but, by itself, each is partial and incomplete. Any one or even two will be likely to produce a program that is slanted and lacks some essential ingredients of success.

What drives the model? Each perspective is conditioned by a force exogenous to the model. One external force is technological change itself. Three waves of products have hit the marketplace since the late '70s. The first was word processing, which was followed by the less successful electronic mail boom and the appearance of ancillary communications products such as local networks. Recently, we have stood in awe at the start of a third wave, personal computing. Configuring these and miscellaneous other OA appliances into a coherent set of systems components is the essence of technology delivery.

A second external factor is behavioral change. For 30 years DP has been laboring under the difficulty and reluctance experienced by people interacting with computers. OA greatly broadens the population of people coming into direct contact with technology. It also adds the prospect of addressing managerial, professional and executive workers — people who are less pliable or subject to coercion than traditional users.

The tendency is to brace for monumental resistance. As a result, OA managers frequently are caught off guard as the great transformation in user behavior takes place in the wake of the home and school computing boom. Nothing does more to destroy the notion that sitting at a keyboard is demeaning or wasteful of time than having one's 10-year-old daughter ask for help debugging her homework program. Times change. The issue is now frequently one of coping with a flood of user-requested junk technology.

The third exogenous factor is the overall business environment. Management's perspective is conditioned by a world of competition and resource constraints. Factors such as the strategic moves of other companies in the industry, the arrival of new players with a differentiated or lower cost product and the attractiveness of alternative means of deploying capital all affect OA or any technology as it becomes more integral to the products and processes of the firm.

One large manufacturer accelerated its investment in OA by 750% over a two-year period. This happened when the chairman saw a way to tie together his entire sales force, order entry system, production scheduling process and distribution network by means of a reliable electronic mail package that had a sophisticated forms capability for semistructured communications.

In addition to these external forces, the model has internal tensions. Sometimes these tensions manifest themselves as coalitions of two of the underlying points of view in juxtaposition to the third. At other times, two perspectives are merely placed by circumstances in a position where they are dependent on the skills or experience of the other. In any case, such tensions generate the planning issues for OA.

The issue between management and users is one of agreeing on a new set of management practices and disciplines. These practices and disciplines must be appropriate to control the emerging technology, assimilate it productively and realize its potential. Among the tools and techniques that must supplement conventional asset management practices in the course of nurturing an OA program are pilot tests and prototypes, user groups, information centers, hot lines, operational and procedural coordinators, new job descriptions and job reclassification.

The problem of roles and responsibilities for the OA function pits users and technicians against one another. In its inception, office automation at a company may be in the organizational bailiwick of any or all of the technical components of which OA is a descendant — DP, WP or communications. Far more important than the warfare of these technical specialties over OA, however, is the massive shift of responsibility for systems planning, development and operations to end users. Two admittedly extreme but nonetheless portentous current catch phrases are "one man, one computer," and "everybody programs." Both grossly oversimplify the problem of allocating resources and rechartering information systems and OA to serve

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The Executive Microcomputer Conference and Exposition (EMCE) is sponsored by the Conference Management Group of CW Communications/Inc., publishers of *Computerworld*, *InfoWorld*, *ISO WORLD*, and *PC World*. And it's designed especially for executives who are responsible for the selection or use of micros in their organizations, executives who use micros as decision support tools, and business managers who employ (or want to employ) micros to manage their businesses.

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I. For Executives in large corporations who are involved in using micros in distributed data processing or as standalone executive workstations, the EMCE conference program includes:

- *Keynote: Increasing Corporate Productivity via the Personal Computer* — (Thurs.)
- *The Executive/Professional Workstation* — (Thurs.)
- *DDP with Microcomputers* — (Thurs.)
- *The Information Resource Center* — (Friday)
- *The Role of Apple and IBM in Corporate Computing* — (Friday)
- *New Issues of Confidentiality and Security in Organizational Information Processing* — (Friday)
- *Personal Computer Acquisition and Implementation Strategies* — (Friday)
- *Compatible Systems and Software for the IBM PC* — (Friday)

II. For Executives who are concerned with the selection and use of microcomputers **primarily in smaller businesses**, the EMCE conference highlights:

- *Keynote: The Personal Computer: The Mouse that Roared!* — (Thurs.)
- *How to Buy a Personal Computer* — (Thurs.)
- *Spread Sheet/Financial Applications* — (Thurs.)
- *New and Future Trends in Personal Computing* — (Thurs.)
- *Word Processing Packages for Personal Computers* — (Friday)
- *DBMS on Personal Computers* — (Friday)
- *A Look at Integrated Software Packages* — (Friday)
- *Panel: Executive Personal Computer Success* — (Friday)

III. For Executives who wish to keep up with changing microcomputer technologies in **mass storage, business graphics, operating systems** and more, the EMCE conference highlights:

- *Keynote: The Future of Personal Computer Software for Business* — (Thurs.)
- *What's New in Peripherals* — (Thurs.)
- *Developments in Personal Computer Business Graphics* — (Thurs.)
- *Mass Storage Capabilities* — (Thurs.)
- *Information Utilities* — (Thurs.)
- *Popular Programming Languages* — (Thurs.)
- *Operating System Selection: 8 to 16 Bit* — (Thurs.)
- *Developments in Networking* — (Friday)

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2. *$5.00 discount* on admission price at the door.

Register for EMCE now! The Sheraton Centre in New York City is the place; June 23-25, 1983 are the dates. Exposition hours: 11-7, Thursday and Friday; 10-6, Saturday. For more information on the conference and exposition, dial 1-800-225-4698 (In Massachusetts, 617-879-0700) and ask for Louise.

FREE SATURDAY FEATURE SESSIONS FOR ALL ATTENDEES

FREE Special Feature Sessions for exhibit and conference attendees will be held Saturday, June 25 from 9:00-1:00 p.m. The sessions will focus on professional applications for micros and starting your own home based business or office, and will also discuss the personal computers impact on family life, kids and recreation.

SPECIAL HANDS-ON WORKSHOP

In addition to the main conference program, EMCE will offer a two-day **Executive Microcomputer Workshop** for those professionals who wish to get hands-on experience with an Apple or IBM Personal Computer. The workshop will focus on four specific applications: spreadsheet analysis using VISICALC, data base management using dBase II, graphics and communications. An in-class network will be set-up to demonstrate the communications capabilities of personal computers. The two-day seminar will run concurrently with the EMCE Conference Program and will include admission to the exhibits and special feature sessions on Saturday, June 25. **The Executive Microcomputer Workshop** will be sponsored by the Personal Computer Learning Center of New York City and will be held at the Center, located at 1120 Avenue of the Americas, on Thursday and Friday June 23 & 24. **Enrollment is limited,** so please register early with your choice of hands-on using either an Apple or an IBM PC.

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For Educators and Administrators, EMCE will hold a special seminar on Saturday, June 25th entitled *Microcomputers in Education* which includes the following sessions designed to suit the unique needs of education:

- *Keynote: Computer Assisted Instruction in Education*
- *Computer Funding and Acquisition*
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- *Educational Computing at Home*

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June 23-25, 1983

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REGISTRATIONS CANCELLED later than June 15 are subject to a $50.00 service charge. Registration may be transferred at no charge.

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EMOA2

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- ☐ Advance Pre-Paid 3 day exhibit registration $20 ($25 at door)
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  - ☐ Saturday

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in a new environment — one with a rapidly rising level of user comfort, if not competence, with information technology.

Between management and technicians emerges the issue of integration. Utility infrastructures for processing, data stores, or data flow present an attraction to one and a threat to the other. The situation is reminiscent of the alternatives that appear in any less developed country as it endeavors to decide whether to invest limited resources first in a transportation and communications system or in better farm implements and industry. One underpins the success and usefulness of the other. The appropriate mix of general architecture and specific appliances must be found by understanding the nature and extent of systems integration called for by the business.

"The assessment should not be an end in itself. We want to solve problems, not admire them."

Another issue appearing in the model is the applications portfolio. All three forces impinge on the determination of the specific applications as well as on their development priority, timing and sequence. Responding to external forces and internal tensions, the model fairly represents the environment within which an OA program takes shape. When forces are out of balance, movement tends to take place to restore equalization. Note that the points of view are not monolithic within an organization. In a large or diversified corporation, separate instances of the model may (and should) appear by location, function or strategic business unit.

The model framework relating users, technicians and management can also be relied upon for the very practical purpose of guiding and informing a successful strategic planning effort.

A good way to start is with an assessment. The purpose is to document where an organization now stands with regard to OA. What systems are in place? Who uses them? For what purpose? Each point of view must be canvassed. We want to know what has happened during each of the three waves of OA technology. We need to understand whether the fundamental transition in user behavior from reticence to enthusiasm has taken place. And we need to understand management's view of the office. Is it overhead? An intermediary? A means of accomplishing organizational goals? The assessment yields objective data for planning purposes. An accurate snapshot of a company's use of technology has an unfreezing effect, permitting and even inspiring parties with different points of view to begin communicating from some common ground.

Although such dialogue may be useful, it does not follow that the management process of planning should bog down in endless quantitative exercises. The executive who claims he cannot manage what he cannot measure may not be well suited to the management needs of a company moving into the information age. When new systems are being introduced into an enterprise, it is helpful to experience the technology in a relatively free-form manner at first. This is particularly true of systems that require substantial behavioral and organizational change for their power to be realized. Otherwise, unanticipated benefits (which always turn out to be far more significant than the expected ones) are choked off.

The assessment should not be an end in itself. The idea is not to create tragic awareness. We want to solve problems, not admire them. The strategic planner who tells us we are bounded by the past is like the psychiatrist who encourages his patient to leap up from the couch to kill his father and marry his mother. The true purpose of a business assessment is much closer to the real purpose of psychoanalysis for an individual — to investigate the past in sufficient depth and detail to be freed of it, becoming neither unnecessarily constrained by it nor bound to repeat it. Data collection should liberate. It makes future action both reasonable and different. Consequently, a good assessment is prologue to a strategic plan that is at once significant and likely to succeed.

After current capabilities have been assessed, the next step is therefore to move on expeditiously to future priorities. The strategy establishes a context for decisions. At its best, it is a major

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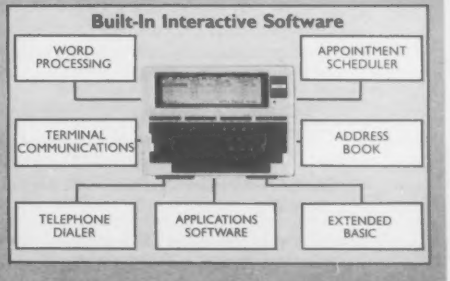

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source of cohesion and commonality of interest. This time, instead of coverage, we are interested in impact. What modules of the technology are most appropriate? What user functions provide the highest leverage? What business cases are the most important? In general, what is the overall direction, posture and level of effort going to be for OA?

In addition to priorities, there is the question about progress in OA. Is there a natural progression, a preferred trajectory beginning with certain starter systems and leading to an advanced OA environment? Certainly some ways of setting the stage appear to be preferable to others. The first step into the office of the future is not to remove technology from the office, thereby isolating people from the contact and experience that builds confidence and comfort, new applications ideas and unanticipated benefits.

In addition, there are clear sets of logical and technical dependencies that add texture to a strategy, making it more feasible than one based entirely on priorities. For example, there is little point in implementing a full text indexing system for sophisticated document management when text is not yet being captured in machine-readable form. Likewise, electronic mail programs often fail when an adequate base of already installed terminals for other purposes does not exist for the casual user.

Beyond that, however, it is difficult to generalize. In one case, an early electronic mail system has served well as the foundation for subsequent enhancements to what has become a multipurpose management communications and control system. At other companies, electronic mail has been OA's kiss of death. The same is true with word processing. One diversified manufacturing company has used it as the foundation for a multifunction workstation. At another company, a large insurance firm, the early WP investment has shackled the OA group with insurmountable obstacles for the past five years.

In short, there does not appear to be one right way to go about office automation. No single plan suits all needs. The unique sequence of steps into the office of the future that make the most sense for a company must be individually determined by and for that company.

Having said that, I must also say that a few generic or prototypical strategies appear to be proving successful in the industry today. Summarized in Figure 2, the strategic alternatives break down by dominant point of view. Each alternative rests on a particular business focus and has a characteristic pattern of applications and infrastructure. The appropriate organizational home for the OA function is somewhat suggested by the strategy. We can see companies that choose each strategy turning predictably to one source of ideas and analogies for use in building new management discipline. Each generic strategy also has a typical way of getting started when that focus has been chosen as the strategic direction.

Issue \ Focus	Presentation Services	Information Management	Process/ Products
Leading Point of View	Technician	User	Management
Portfolio Emphasis	Access Methods, Store/Forward	Text Management	Expert Systems
Architecture	Networking	Data Base	Processing
Organizational Home	Information Systems	Administrative Services	Business Unit
Management Discipline	From Networking Resource Management	From Information Resource Management	From Computer Resource Management
Starting Point	Electronic Mail	Word Processing	Personal Computing

Figure 2. What Are The Strategic Alternatives?

The Presentation Services strategy makes OA operate as a delivery vehicle for a company's main-line information systems. The workstation or local network establishes a common layer between diverse users and diverse applications. Companies following this strategy are building systems not unlike the military Network Access Machine designed a decade or so ago. The idea is to make it unnecessary for the user to recall the many telephone numbers, log-on sequences, function keys, special commands, languages and other idiosyncracies of the various hardware and software systems he must access. This strategy rebuilds systems integration in a decentralized processing environment.

The Information Management strategy appears in those companies where OA is defined as that part of the overall information technology investment which focuses on textual information instead of numerical data. Here the heart of the OA system is some kind of document indexing facility, such as IBM's Stairs or one of the more recent and flexible products to appear on the market. Using inverted files, these systems mash together large amounts of textual information from word processors and electronic mail systems. In size and function, they are somewhat like trash compactors. However, they make possible a thorough real-time search and retrieval on virtually any word or combination.

One other generic strategy is to embed OA systems in a company's processes and products. This strategy is based on a view of the office as an intermediary. In the case of a bank, for example, this means the office stands between bank operations or systems and bank customers. OA's role is to enhance that intermediary at first, by giving the officer better access to the bank's systems on behalf of the customers.

In the long run, however, OA can even make the intermediary unnecessary, at least for some functions. In these cases, the bank's customers interact directly with the bank's systems. Early examples of this include money transfer, documentary credit systems and balance reporting. As these kinds of OA systems become more integrated and functional, they begin to use the heuristic modeling techniques of artificial intelligence. The result is advice rather than data.

OA may be a transient phenomenon. Although substantial benefits may accrue from it, it is, in its origins, a manifestation of the shortcomings of the data center. If successful, it will transform DP. One result will be that a new, more responsive and balanced information systems effort will appear, with features suspiciously like the architectures, disciplines and organizational tactics of OA. This is already happening at some companies as the user orientation of OA reappears in a revitalized systems department as client management or an information center. In this respect, the role of OA is to help recharter DP for the information age.

Finally, it should be clear that many of the issues faced by office automation are not likely to be unique to it. The basic framework of forces and most of the issues will remain more or less the same as other information technologies arrive, and business grapples with making them useful. Graphics, robotics, automated design and manufacturing systems and other new technologies must be implemented within a nexus of forces that will include diverging notions of technical merits, functionality and return on investment. In each case, Huck Finns and Tom Sawyers will resurface, as will an eventual pragmatism.

OA

Sullivan is president of Information Technology Planning Corp., a consulting firm in Chicago.

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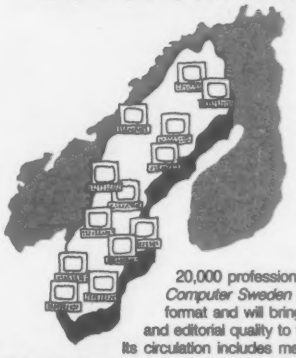

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TECHNOLOGY

ARMONK, N.Y. — The XT microcomputer, featuring a 10M-byte hard disk and the optional capability of communicating with the company's mainframes, has been announced by **IBM.** The XT is a 16-bit system that is software-compatible with the IBM Personal Computer. The basic configuration consists of an Intel Corp. 8088 chip, 128K bytes of random-access memory upgradable to 640K bytes, eight expansion slots, a 5¼-in. dual-sided drive with a 368,640-char. capacity and a detached keyboard.

The IBM XT is available for $4,995 from IBM's System Products Division, P.O. Box 1328, Boca Raton, Fla. 33432.

WESTBORO, Mass. — A software package that translates the format codes of documents produced on Wang Laboratories, Inc. word processing systems to those of **Data General Corp.'s** Comprehensive Electronic Office (CEO) systems, has been introduced by DG, which also introduced a superminicomputer aimed at the office.

The CEO Document Exchange software package allows documents received on either CEO or Wang systems to be edited, filed or mailed as if they were produced on that system. According to DG, this is the first product that allows bivendor document exchange. The new package makes DG's CEO systems and Wang's WP products document-format-compatible. The CEO Document Exchange can be used with documents created on Wang WP systems, Office Information Systems and Wang VS computers running WP software.

In addition, the CEO Document Exchange can interpret address blocks used in Wang's Mailway, acting as an interface between the two electronic mail environments.

Initial license fee for the CEO Document Exchange is $5,000 and subsequent licenses are $2,500.

The Eclipse MV/10000 superminicomputer — which DG claims is 60% faster than IBM's 4341 Model Group 12 at one-third the cost — is a 32-bit system, software-compatible with all of DG's 32-bit and 16-bit minicomputer lines and offers support for up to 192 terminals. It will be marketed as a mainframe replacement.

The MV/10000 system, including 2M bytes of main memory, 147M-byte disk, a dual-mode tape drive, a 16-line intelligent asynchronous controller, a Dasher TP2 printer with keyboard and DG's AOS/VS operating system license and cabinet, is available for $211,000 from DG, 4400 Computer Drive, Westboro, Mass. 01580.

AUSTIN, Texas — **Texas Instruments, Inc.** debuted the Professional Computer, its first microcomputer for business applications that does not incorporate a TI-manufactured microprocessor. The system uses Intel Corp.'s 8088 16-bit microprocessor and can also be enhanced with a voice management system and "natural language" option, which won't be available until the third quarter of this year.

The Professional Computer's basic configuration includes 64K bytes of random-access memory, a 12-in. black-and-white monitor, a keyboard containing 12 function keys and a 320K-byte diskette drive. A configuration more typical for business applications consists of the same amount of memory, the same keyboard, a 13-in. color display and dual 320K-byte diskettes.

The basic Professional Computer system costs $2,595. The expanded version with the color monitor and dual disk drives is priced at $3,840. The prices do not include software.

In addition, TI unveiled a 150 char./sec dot-matrix graphics printer, the Model 850, for $599.

More information is available from Texas Instrument's Data Systems Group, 12501 Research Blvd., Austin, Texas 78769.

MAYNARD, Mass. — **Digital Equipment Corp.** announced availability of its first Decnet/SNA Gateway as well as an All-In-One graphics capability. The gateway enables VAX superminicomputers in a Decnet network to access IBM Systems Network Architecture (SNA) resources. It is the first in a family of gateways to link Digital's computer networks to SNA networks. Later implementations of the gateway will enable PDP-11 minicomputers and Professional 300 series personal computers in a Decnet environment to access SNA networks.

The Decnet/SNA Gateway is a customized dedicated system incorporating a PDP-11/24 central processor and communications interfaces. It runs special-purpose gateway software. Associated routines for remote job entry (RJE), 3270 terminal emulation, applications interface and gateway management run under the VMS operating system of each VAX system that connects to the gateway.

The gateway has a base price of $26,995, with associated components for the gateway and VAX computers ranging from $550 to $8,500. Software components for the VAX systems are available separately. They consist of gateway management, RJE, 3270 emulation and application interface packages and are priced at $550, $5,000 and $8,500 respectively. The Graphics Program, which encompasses a combination of hardware and software products, includes VAX-11 Decgraph, VAX-11 Decslide, Polygraphix and Fingraph.

The new products can be accessed

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A System With
A Head For Numbers,
An Eye For Pictures,
And A Mind
Of Its Own.

through the All-in-One menu via a variety of professional workstations. Licenses for the products range in price from $3,500 to $6,000. DEC also announced improved Dectype layered WP software for VAX computer systems, as well as an agreement with the Houghton-Mifflin Co. to incorporate an advanced spelling verification/correction package into the All-In-One set of integrated office products.

In addition, DEC unveiled a money-back guarantee covering all VAX-based All-In-One office automation systems, which allows a customer to return the product within 120 days after delivery for a full refund of the hardware purchase price and software license fees, the vendor said.

DEC is at 146 Main St., Maynard, Mass. 01754

LOWELL, Mass. — **Wang Laboratories, Inc.** has announced a number of enhancements, including some to its Digital Voice Exchange (DVX), the automated voice communications system that allows a user to receive, create and send voice messages (called Voicegrams) to one or more individuals.

The enhancements include the introduction of a peripheral device that provides full voice capability when attached to an OIS 145; the availability of word and voice processing capabilities on the same system with the addition of Wang word processing to the DVX; the addition of a message management system that allows anyone to deposit voice messages for DVX subscribers; and the addition of a software package that adds a number of new DVX features, including name confirmation, broadcast and blackout capability, non-user information alert, management statistical tracking and an optional message-waiting notification terminal.

The DVX Option supports up to 250 users at a cost of $54,000, and the DVX with WP is available for $119,300 to $248,300.

Wang is also offering OIS Small List Processing and OIS Small Spelling Verifier software on the entry-level OIS 105-1 and OIS 115-2 WP systems. Either of the two offerings is available for an initial license fee of $500 and an annual license fee of $60.

In addition, two enhancements are offered and were designed to complement the Wang Professional Computer: the Professional Computer Data Base, a user-oriented package that formats and manipulates data; and the PC Business Graphics software, which utilizes statistical information in business graph form. The two cost $650 and $300 respectively, from Wang, One Industrial Ave., Lowell, Mass. 01851.

CAMBRIDGE, Mass. — **Lotus Development Corp.** announced that its "1-2-3" microcomputer program is available to run on the new Texas Instruments Professional Computer.

Introduced last October, 1-2-3, an advanced software package that integrates graphics, spreadsheet analysis and information management into one program, also runs on the IBM Personal Computer and the Compaq Computer Corp. Portable Computer.

The software is being distributed for $495 by both Softsel Computer Products, Inc., a major software distribution concern, and by Lotus Development Corp., 55 Wheeler St., Cambridge, Mass. 02138.

VIENNA, Va. — **GTE Telenet Communications Corp.** has introduced the TP3005, a small-scale X.25 network interface processor for access to public or dedicated packet-switched networks. The unit was designed as an economical concentrator for four asynchronous terminal or host computer connections. The unit supports CCITT international recommendations for asynchronous terminals (X.3, X.28 and X.29) as well as Telenet enhanced parameters.

As an integrated component of GTE Telenet's public and dedicated packet network systems, the TP3005 is fully supported by the company's network control facilities. Capabilities include remote configuration, down-line loading, alarm reporting, remote diagnostics and accounting information on a port-by-port basis.

The TP3005 is available for $2,350 (including a three-year software license) from GTE, 8229 Boone Blvd., Vienna, Va. 22180.

ROCHESTER, N.Y. — Ten new features plus several enhancements for the Officepower Release 2 have been announced by **Computer Consoles, Inc.** The new features include an applications package designed to create and handle user-defined forms, automatic spelling verification and intersystem mail capabilities. Other provisions include special calendar graphics, table arithmetic, list processing and automatic paragraph and section numbering. An electronic spreadsheet is also available.

The Officepower Release 2 is available for $32,000, including hardware, software and eight communications ports (printers and terminals are extra) from Computer Consoles, Inc., 97 Humboldt St., Rochester, N.Y. 14609

GRAND RAPIDS, Mich. — Six workstation designs fitting specific needs in the electronic office have been introduced by **Steelcase, Inc.**, a leading manufacturer of office furniture. The task-oriented workstations reportedly meet functional and com-

Introducing the Kodak KAR-4000 information system

Take the processing power of a stand-alone computer. Add a "photographic memory" to access original document images. Top it off with comprehensive, one-source software and service.

The result: a Kodak KAR-4000 information system.

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The result: independent computer-controlled access to on-line data and documents. Without the staggering expense of on-line computer storage.

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Business Systems Markets Division
Dept. DP 3546
Rochester, NY 14650

Please answer the following:
1. How many incoming documents per day do you process? ☐ 1000–2000 ☐ 2000–5000 ☐ Over 5000
2. How many documents do you normally retrieve each day? ☐ Less than 10 ☐ 10-25 ☐ Over 25

fort requirements with components from the company's Series 9000 line of systems furniture and fully adjustable Concentrx seating.

Designed to boost productivity by providing an ideal furniture configuration for each worker, the workstations can be modified to suit special tasks and accommodate new equipment, the vendor said. The new Effective Workstations have been designed for six job categories: data entry, data retrieval, word processing, programming/systems analysis, secretarial and managerial functions.

The workstation designs are available for $2,900 to $11,000 from Steelcase, Inc., 1120 36 St., S.E. Grand Rapids, Mich. 49501.

STAMFORD, Conn. — **Exxon Office Systems Co.** has introduced three models of the Exxon 8400 Series of shared-resource office automation systems. The 8400 Series includes Models 8411, 8421 and 8431, which range in storage capacity from 512K bytes of main memory and 14.5M bytes of hard-disk storage to 2M bytes of main memory and 306M bytes of disk memory. Prices for the systems start at $27,500.

The company also announced the Exxon 965 Ink Jet Printer, which uses a proprietary ink and snap-in cartridge containing enough ink to produce four million characters. Intended for use with the Exxon 500 Series Information Processors, the Exxon 965 operates at speeds ranging from 60 char./sec to 90 char./sec, depending on pitch. Depending on software, the printer is available for between $4,600 to $6,000 from Exxon Office Systems Co., 777 Long Ridge Road, Stamford, Conn. 06902.

MAYNARD, Mass. — **Digital Equipment Corp.** and **Micro Business Software, Inc. (MBSI)** of Chichester, N.H., have announced a cooperative marketing agreement to promote Realworld, an integrated financial accounting system, for Digital's Professional 300 series and Rainbow 100 personal computers and the Micro/PDP-11 multiuser desktop system.

Realworld software, introduced in 1974 for minicomputers, comprises seven Cobol applications, including accounts receivable, accounts payable, general ledger, payroll, sales analysis, order entry/billing and inventory control.

The Digital versions will run on the 16-bit Professional 300 series personal computers under the proprietary Professional Operating System. On the Rainbow 100, the system will operate in 16-bit (8088) mode under the Digital Research, Inc. CP/M 80/86.

Realworld software will be available for a license fee of $650 per application beginning in May from various outlets including Hamilton Microsystems, Computerland stores, authorized Digital Computer distributors and other Digital OEMs.

MOUNTAIN VIEW, Calif. — **Grid Systems Corp.** has introduced the Grid 3101 and Grid VT100 programs, which allow its Compass portable computer to communicate interactively with programs running on IBM's 370, 30 series and 3080 mainframes as well as all Digital Equipment Corp. VAX-11 superminis.

Besides the emulation packages, Grid announced support of IBM's MS-DOS operating system for the Compass; two Compass-compatible local disk storage devices, the M2101 and the M2103; and Gridprint, a document formatting software package that enables Compass users to format documents more easily to be printed on the vendor's dot matrix printer.

The Grid 3101 and Grid VT100 emulation packages cost $200 each; the one-time cost for the MS-DOS operating system is $150; prices for the disk drives are $4,100 for the M2101 and $1,195 for the M2103. Gridprint is available for $75 from Grid Systems Corp., 2535 Garcia Ave., Mountain View, Calif. 94043.

WALTHAM, Mass. — A compact, economical version of the Express Decision Support Systems software was announced by **Management Decisions Systems, Inc. (MDS).** The Express E300/600 system, designed to run on the new Prime Computer, Inc. 2250 minicomputer, has 2M bytes of memory (expandable to 3M bytes) and 68M bytes of storage (expandable to 632M bytes). The system was designed to be used by executives and managers for analytical problem solving and management of finance, marketing and operations.

The Express E300/600 is expected to attract a larger audience than the previous Express system, which was available only on large computers like the IBM 4341 and the Prime 750 or 850 and sold for $300,000.

The E300 system will sell for $125,000; the E600 for $180,000, including both hardware and software, from Management Decisions Systems, Inc., 200 Fifth Ave., Waltham, Mass. 02254.

BATAVIA, Ill. — **Uniq Computer Corp.** has unveiled Unibase, a high-speed data base management system utilizing back-end processor technology and Unix System III software on the Digital Equipment Corp. VAX system. Unibase uses a hardware/software combination approach that reportedly handles management functions up to 10 times faster than conventional software-based data base management systems, while of-

In the last
few months,
5,628 word processors
and personal computers
have joined
1.5 million subscribers
on the worldwide
Telex network.

The owners of 7 explain why
you should consider joining.

fering the opportunity to create centralized shared-access data base networks.

Unibase will support up to 64 host processors, allowing the creation of large centralized shared data networks. Unibase prices start at approximately $126,000 including VAX 11/730, IDM 200, Unibase Software Package and 100M bytes of disk storage capacity. More information is available from Uniq Computer Corp., 28 S. Water St., Batavia, Ill. 60510.

SAN JOSE, Calif — A business-oriented 8-bit system said to be capable of supporting three users simultaneously and featuring up to 10M bytes of storage capacity was introduced by **Altos Computer Systems, Inc.**

The Model 580-10 includes a Zilog, Inc. Z80 processor, a 192K-byte random-access memory chip and a 5¼-in. 10M-byte hard disk drive. The Digital Research, Inc. MP/M II multiuser operating system comes standard with the system. The Model 580-10 is available for $6,490 from Altos Computer Systems, Inc., 2360 Bering Drive, San Jose, Calif. 95131.

CHICAGO — **AB Dick Co.** has introduced two software packages designed to enhance workstation multifunctionality for its Magna III and Magna-Writer information processing systems. The two packages, created for Digital Equipment Corp. VT52 terminal emulation and Sorcim Corp.'s Supercalc, are both based on Digital Research, Inc.'s CP/M operating system and provide word and data processing capabilities for general business and education applications.

The DEC VT52 terminal emulation package is available for $300; Supercalc costs $295. Both packages are used with optional Magna III and Magna-Writer capability, priced at $300 from AB Dick, 5700 W. Touhy Ave., Chicago, Ill. 60648.

WINDHAM, N.H. — A distributed decision support system that runs on IBM systems from micros through minis has been unveiled by **Evaluation and Planning Systems, Inc. (EPS)**. The software is composed of FCS-EPS for Distributed Decision Support, its DSS package for minis and mainframes and its Micro FCS for microcomputers.

The FCS-EPS provides a standardized decision support language, common information at all levels, mainframe modeling and analysis power on the micro and controlled additional use of existing corporate information.

FSC-EPS is compatible with systems from IBM, Hewlett-Packard Co., Wang Laboratories, Inc., Honeywell, Inc., Digital Equipment Corp. and others, the vendor said.

The mainframe version of FCS-EPS is priced from $48,000 to $140,000 depending on configuration. The minicomputer version is available for between $25,000 and $60,000 and the Micro FCS for $300 with volume discounts from EPS, One Industrial Drive, Windham, N.H. 03087.

WESTFORD, Mass. — **Interlan, Inc.** has introduced a controller board said to be the first to connect Data General Corp. minicomputers to the Xerox Corp. Ethernet local-area network.

The N14010A Data General Ethernet/IEEE-802 CSMA/CD Communications Controller is said to be an intelligent controller board that contains the data communications logic required for interfacing DG's Nova, Eclipse and 32-bit Eclipse/MV minicomputers to Ethernet.

The controller is available for $2,490 from Interlan, 3 Liberty Way, Westford, Mass. 01886.

ORLANDO, Fla. — **Technology International Corp.** has announced two modular word processing systems, the Edit Pak System II and the Edit Pak System III.

The Edit Pak System II features 64K bytes of memory, document-oriented storage and retrieval, a 12-in. monitor, a 40-char./sec letter-quality daisy wheel printer, a double-sided and double-density disk drive and a CP/M operating system from Digital Research, Inc.

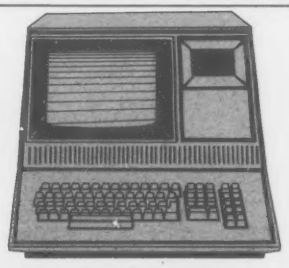
The Edit Pak System III features a double disk drive that can be expanded to include a Winchester hard disk.

The Edit Pak System II is available for $5,995 and the System III for $6,495 from Technology International, P.O. Box 13457, 9715 S. Orange Ave., Orlando, Fla. 32859.

NATICK, Mass. — **Micro-Systems International Corp.** has unveiled a multibus microcomputer system with a distributed processing operating system. The operating system reportedly gives each user access to a dedicated processor and manages common resources disk files and printers.

The Multi-Net system is compatible with Digital Research, Inc.'s CP/M operating system and features both a Zilog, Inc. Z80 8-bit chip and an Intel Corp. 8086 16-bit microprocessor. Together, the two microprocessors can support up to eight concurrent users, the firm said.

A basic two-user system with a 64K-byte master processor, two user processors and a one-year warranty costs $9,995, the vendor said. More information is available from Micro-Systems at 12 Mercer Road, Natick, Mass. 01760. OA



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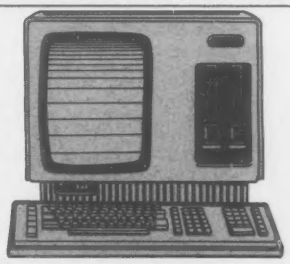
"I very much love the ease of correcting on my word processor."



Owner of a CPT 8500:™

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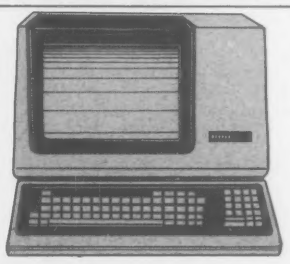

Owner of a Digital VT180®:

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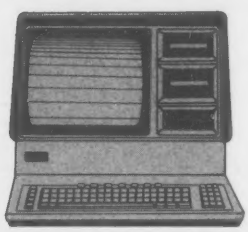

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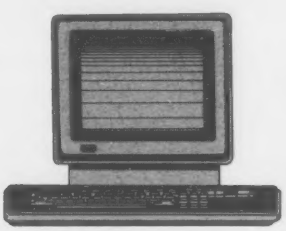
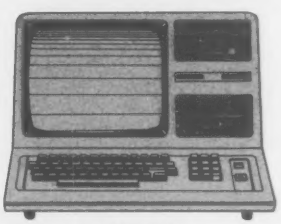


Owner of a Wang:

"This new service really sold itself to upper management."



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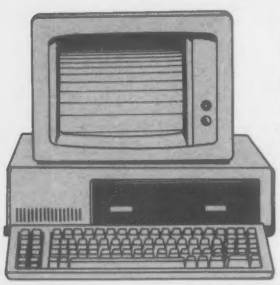

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April 25-27, Washington, D.C. — **Long-Range Information Systems Planning.** Also Dallas, May 16-18; New York, June 1-3; San Francisco, June 1-3. Contact: American Management Associations, 135 W. 50th St., New York, N.Y. 10020.

April 25-27, Chicago — **Improving Office Productivity: Principles and Practices.** Also Washington, D.C., May 4-6. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

April 25-27, Los Angeles — **Relational Data Base.** Contact: Technology Transfer Institute, 741 10th St., Santa Monica, Calif. 90402.

April 25-27, Chicago — **Office Automation: Concepts, Systems and Applications.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

April 25-29, Chicago — **The Productivity Seminar with James Martin.** Also, Washington, D.C., May 2-6. Contact: Technology Transfer Institute, 741 10th St., Santa Monica, Calif. 90402.

April 27-29, New York — **Information Systems Planning: A Structured Approach.** Also San Francisco, May 9-11. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

April 28-29, New York — **Visicalc.** Also Atlanta, May 19-20; Washington, D.C., May 26-27; Boston, June 9-10. Contact: American Management Associations, 135 W. 50th St., New York, N.Y. 10020.

April 28-29, San Francisco — **Local-Area Networks: Selection Guidelines.** Also, New York, May 26-27. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

April 28-29, San Francisco — **Shared Information Management: Effective Means of Defining User/DP Roles.** Contact: Boeing Computer Services Co., Education and Training Division, P.O. Box 24346, Mail Stop 9A-90, Seattle, Wash. 98124.

May 2-4, San Francisco — **Local-Area Networks: Concepts, Technology and Products.** Also, Boston May 17-19; San Diego, May 23-25. Contact: Technology Concepts, Inc., 730 Boston Post Road, Sudbury, Mass. 01776.

May 4-6, Chicago — **Distributed Systems Design: Microcomputers to Mainframes.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

May 16-18, New York — **Office Automation: Strategic Planning.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

May 16-19, Anaheim, Calif. — **National Computer Conference.** Contact: American Federation of Information Processing Societies, Inc., 1815 N.Lynn St., Arlington, Va. 22209.

May 17-20, New York — **Planning for Office Systems.** Also, Los Angeles, June 14-17. Contact: IBM, Information Systems Management Institute, 3350 Wilshire Blvd., Los Angeles, Calif. 90010.

May 23-24, San Francisco — **User-Friendly Information Delivery: Approaches to On-Line Systems Development.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

May 25-27, Boston — **The Personal Computer: Strategies for Managing.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

June 13-15, San Francisco — **American Bell's Net 1000 with Michael Hammer.** Contact: Technology Transfer Institute, 741 10th St., Santa Monica, Calif. 90402.

June 13-16, San Francisco — **Integrated Systems: The Technologies and Their Uses — Syntopican XI.** Contact: International Information/Word Processing Association, 1015 N. York Road, Willow Grove, Pa. 19090.

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